Rock Products

$2.00 A YEAR CHICAGO MAY 10, 1919

for 5 years the elements tried to destroy it—but today it is as good as new

A Keystone Kiln has stood—with top uncovered—since 1914 at a deserted quarry of the Montgomery Lime Company in Houchins, Va.

Today it is being moved sixty miles to a new location by the Kimbalton Lime Co. It is as good as new!

So satisfactory was its performance during the nine years of actual use that the Kimbalton Lime Co. has ordered a sister kiln to meet increased-production plans.

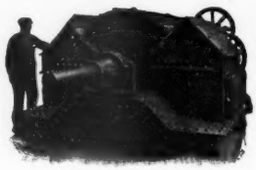
Keystone Kilns

Here you have proof of singular durability and working merit. And note that the Keystone can be moved. This can be done with no other kiln.

234 Kilns in Use to Date

Steacy-Schmidt Manufacturing Co.
York, Penna.

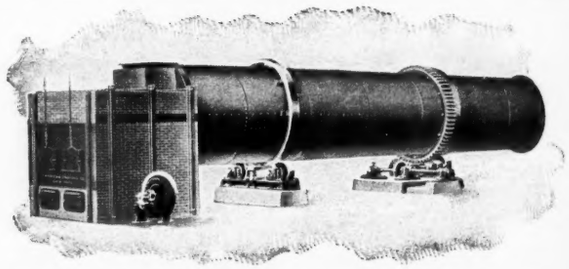
"PENNSYLVANIA" Hammer Crushers



PATENTED

For Crushing and Pulverizing Lime, Limestone, Gypsum, Marl, Shale, Etc. Main Frame of Steel, "Ball and Socket" Self Aligning Bearings; forged Steel Shaft; Steel Wear Liners; Cage adjustable by hand wheel while Crusher is running. No other hammer Crusher has such a big Safety Factor.

Pennsylvania Crusher Company
New York PHILADELPHIA Pittsburgh



DRYERS

AMERICAN PROCESS CO. 68 Williams Street NEW YORK CITY

ATTENTION

Cement Manufacturers and Supply Dealers

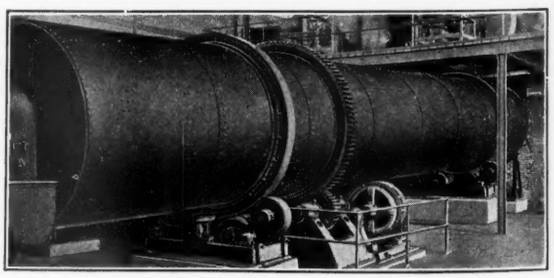
If you will examine your cement that was packed in Jaite Bags over the winter months you will find the cement in better condition than cement packed in other paper or cotton bags.

Ours Excludes the Moisture

THE JAITE CO.
JAITE, OHIO
Sole Manufacturers

Ruggles-Coles Dryers

for coal, clays, sand, stone, etc. They will burn less fuel than any other type and with their low power and repair costs are most economical to operate.



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Ruggles-Coles Engineering Co.
McCormick Building Chicago **50 Church Street New York**

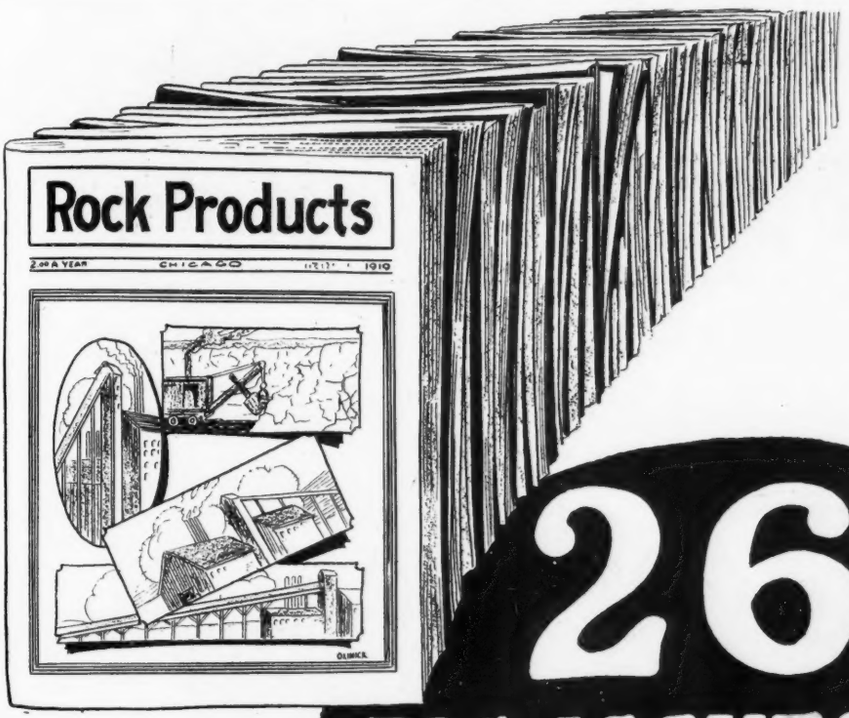
WORKS: YORK, PENNSYLVANIA

We Design and Equip Complete Plants

for the manufacture of gypsum products, such as wall plaster, moulding plaster, wall board products, gypsum block products, also mixing plants.

We are prepared to furnish complete machinery-equipment and design and furnish plans for the installation. Consult our Engineering Department. Forty years' experience in designing of wall plaster machinery and plants.

The J. B. Ehrsam & Sons Mfg. Co.
Engineers, Machinists and Founders
Enterprise, Kansas



Lots of Pictures

26 BIG ISSUES for $2

Covers

completely the interests of producers of Lime, Cement, Gypsum Products, Crushed Stone, Sand, Gravel, Agricultural Limestone, Phosphate, Potash and Glass Sand.

Rock Products

is more than the journal of your industry. It is a SERVICE—definite—authoritative—comprehensive—complete. ¶ Every two weeks it comes to you—an expensive compilation of what has happened during the past fortnight in the way of trade activity—selling, buying, legislation. ¶ And there are articles, too—about interesting quarries, pits, lime plants and so on. ¶ In every issue you will also find incorporated new ideas in the day's work—stunts that will make or save you money.

This Issue or Any Other, Substantiates the Above Review of ROCK PRODUCTS

Market Prices

Not the least of ROCK PRODUCTS' service is the current market quotations. Always up to the minute and divided into localities. This feature alone should induce you to mail the coupon. Do it! Fill in and mail without delay so that you will get the next issue!

ROCK PRODUCTS is published every other week by Tradepress Publishing Corporation, 542 So. Dearborn St., Chicago. Subscription: $2.00 a year in the United States, $3.00 in Canada. Entered as second class matter July 2, 1907, at the postoffice in Chicago, under Act of March 3, 1879.

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542 So. Dearborn St., Chicago

Here is my $2.00 for a full year's subscription to ROCK PRODUCTS.

Name.....

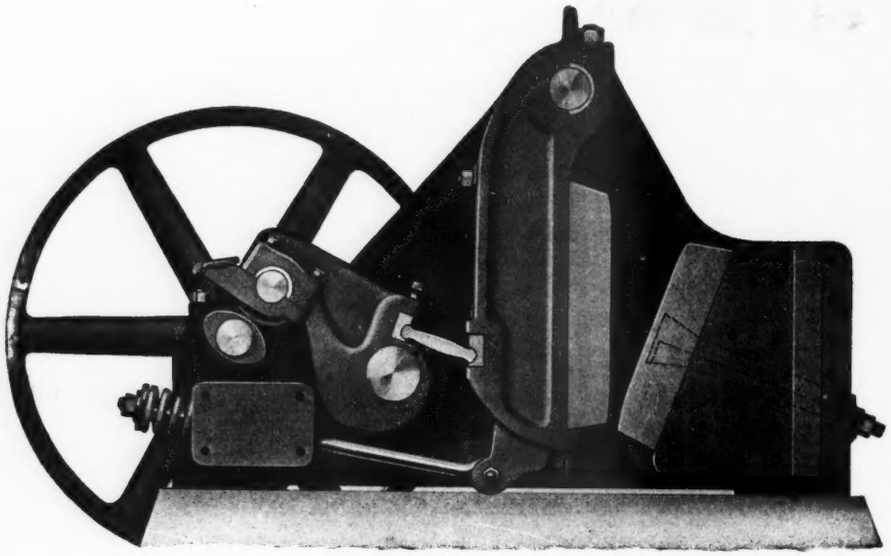
Address.....

Saying, "I saw it in ROCK PRODUCTS," will bring quick action.

"ONE MAN – ONE MINUTE"

STURTEVANT "OPEN-DOOR" MACHINERY

DOUBLE CAM AND ROLL JAW CRUSHERS



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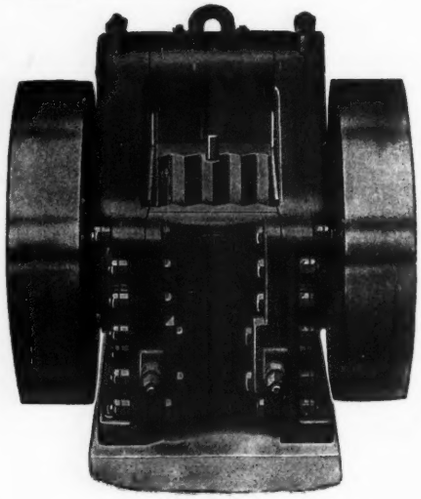
FOR COARSE, INTERMEDIATE, AND FINE CRUSHING

Two jaw nips to each revolution of flywheels. One-half the shaft speed of others to obtain equal outputs. Slow speed. No hot boxes. Small double cam actuating a large roll is the simplest, most powerful and slowest moving action known, hence durability.

Cast steel construction combined with great leverages makes a machine of unusual power, durability and strength.



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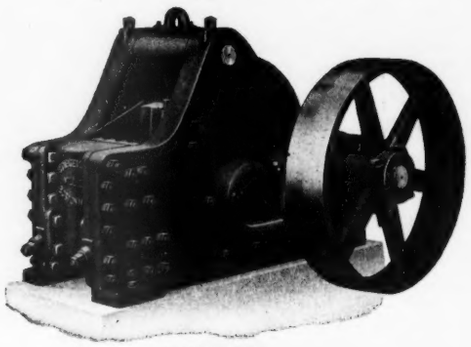
Many Sizes and Different Actions to Suit Various Conditions

ALSO

"OPEN-DOOR" ELEVATORS



PATENTED

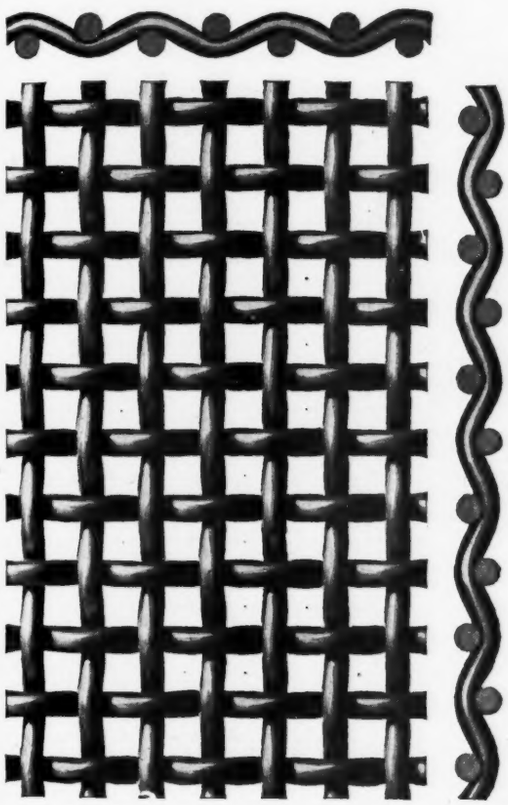
STURTEVANT MILL CO., BOSTON MASS.

HARRISON SQUARE

Cooperation is the thing—please mention ROCK PRODUCTS

"TYLER"

DOUBLE CRIMPED WIRE CLOTH : TON-CAP SCREEN : TESTING SIEVES
TESTING SIEVE SHAKERS : INCLINED VIBRATING SEPARATORS



TYLER Double Crimped Wire Cloth is made in all meshes, for all uses, in

Iron	**Galvanized**
Steel	**Aluminum**
Brass	**Phosphor Bronze**
Copper	**Monel Metal, etc.**
Nickel	

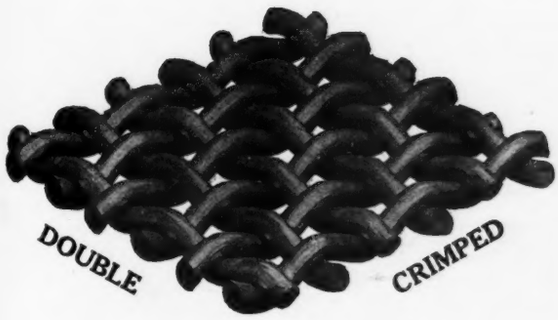
The Double Crimped construction renders both warp and shoot wires immovable, forming a rigid, permanent interlacing.

The sizing through this type of screen is uniform, accurate, and dependable throughout its life.

The Tyler No. 40 General Wire Cloth and Screen Catalogue will be sent you on request

Effective Sorting Action
Obtained with the Whip-Tap

WHIP-TAP SEPARATOR Operated at Drumhead Tension



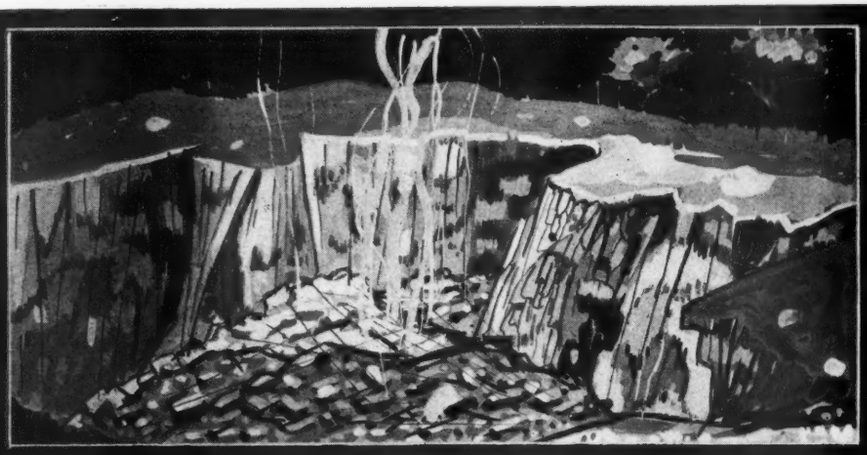
In the WHIP-TAP "Drumhead" Tension Separator the screening surfaces are always operated in a taut, smoothly stretched condition, every wire is vibrated, and the screen is literally alive when vibrated by the whip-hammers.

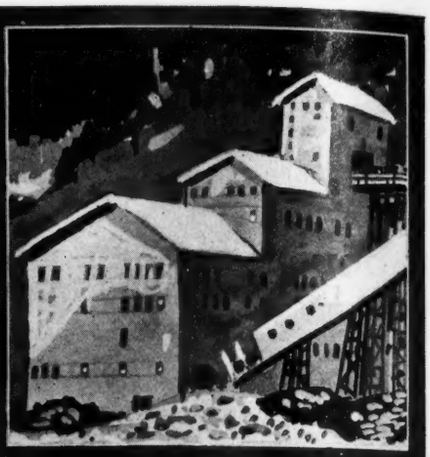
The WHIP-TAP will produce from 20 to 40 per cent more finished material than other types of screen where the wire cloth surfaces become loose and baggy.

Less than one horse-power is required to operate the WHIP-TAP.

Investigate the WHIP-TAP for screening Limestone, Silica, Cement, Gravel, Phosphate Rock and other Rock Products.

The W. S. Tyler Company
Cleveland, Ohio





5,000 Pounds of

AETNA

L. F. Gelatin Dynamite

Blasted

60,000 Tons

of Hardest Trap Rock

It happened in the quarry of the New Haven Trap Rock Co.

Thirty-eight 28-ft. horizontal holes were drilled ten feet apart, and twelve vertical 8-in. diameter well-drill holes were placed twenty-five feet apart. Sixty per cent strength Aetna L. F. Gelatin went into these.

B-o-o-o-m-m!!!

Up the rock was lifted, and down to the bottom it fell in a beautiful mass of well-broken sizes. Then the steam shovels began scooping it up in short order.

It's easy—if you use Aetna!

Always full strength—Always the same—"It does the work!"

Aetna Explosives Company
Incorporated
NEW YORK CITY

Birmingham, Ala.
Buffalo, N. Y.
Chicago, Ill.
Denver, Colo.
Duluth, Minn.
Louisville, Ky.
New Orleans, La
Norristown, Pa.
Pittsburgh, Pa.
Pottsville, Pa.
Roanoke, Va.
St. Louis, Mo.
Wilkes Barre, Pa.

What You Can Do with Telsmith Crushing Equipment

It is not claimed that Telsmith equipment solves all crushing problems. Telsmith has limitations, like all other machinery. But Telsmith has a very, very wide range of utility, due to (1) its pillar shaft and strong, rigid structure, (2) short frame and free bottom discharge, (3) long initial crushing pinch and (4) big eccentric bearings. The following instances serve to illustrate the breadth of Telsmith's field of service.

On a High Perch

At the Penn Iron Co., Vulcan, Mich., two No. 7½ crushers are located in steel and concrete head frames, *forty feet above ground.* Each machine weighs 25 tons; takes 14 inch slabs; crushes a cubic yard of rock in thirty seconds; uses about 40 HP. If it were not for the fact that these crushers operate practically without vibration, even at peak load, this installation would be a short-lived affair.

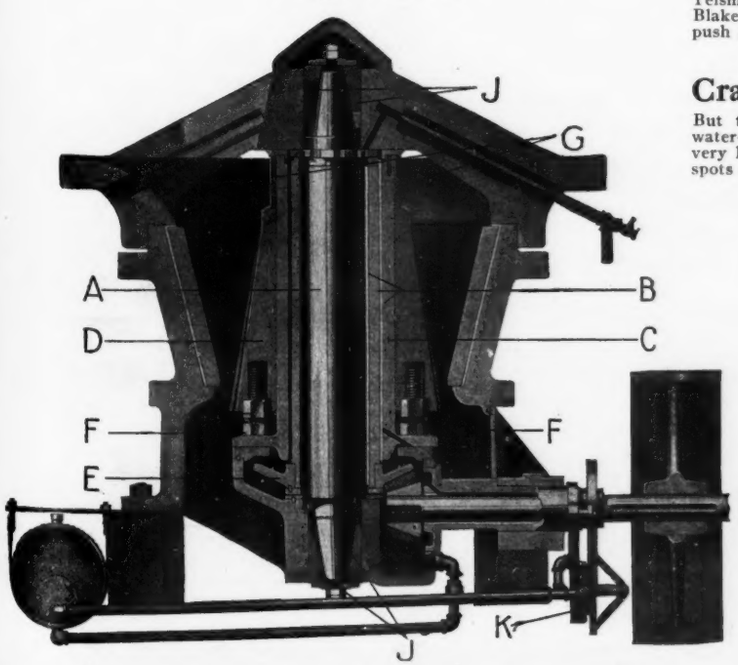
Buried 100 Ft. Deep

Another Telsmith Breaker is working **65 feet under ground.** It has a 20 inch receiving opening; 3½ inch discharge; and a potential output well over 150 cu. yds. per hour. It was lowered down a vertical shaft of very modest proportions and set up in a hole excavated specially for it. The plant is owned by Wasem Plaster Co., Fort Dodge, Ia.

Crowded into Narrow Limits

Illustrating the limited head-room necessary for a Telsmith Breaker, the Charles Warner Company, Wilmington, Delaware, installed a No. 8 Telsmith Primary Breaker where they formerly used a single-roll crusher. The Thomasville Stone & Lime Co., Thomasville, Pa., put in a No. 7½ where there seemed room for nothing but a jaw crusher. This isn't surprising when you realize that the height of the Telsmith Breaker, from sills to rim of crown, is 35 to 50 per cent under that of a gyratory breaker of the lever-shaft type.

GET TELSMITH CAT. No. 166



Smashes Sledges

The Plymouth Gypsum Company of Fort Dodge, Iowa, **crushed a 16-pound sledge** so that it passed through a 2 inch discharge opening. They did it with a No. 5 Telsmith Primary Breaker driven by a 40-HP. motor. The breaker was not visibly damaged in the process. Only the Telsmith short frame and rigid shaft can survive such an accident.

Digests Wet Clay

The Liberty Bell Gold Mining Company, Telluride, Col., is using a No. 6 Telsmith to crush ore, mixed with very wet, sticky clay. This clay clogged the jaw crushers which they formerly used; and the same material still causes considerable trouble in a plant nearby, equipped with a lever-shaft gyratory. At Liberty Bell, the Telsmith parallel stroke and free bottom discharge solved the problem.

Crushes Cast Iron

Manufacturers of ferro alloys are crushing ferro titanium and ferro vanadium with Telsmith equipment. These metals are both **very hard.** Ferro titanium tests under compression at 72,000 pounds per square inch, as against 65,000 pounds for good grey iron. Ferro vanadium is more brittle and abrasive but not so tough. Telsmith does the business.

Breaks Graphite Ore

The Globe Graphite & Refining Company, Port Elmsley, Ontario, is using a No. 5 Telsmith to crush a very rich graphite ore. The straight crushing pinch of the Telsmith Breaker will grip this greasy ore, where a Blake jaw crusher or a lever-shaft gyratory will merely push it up and down in the bowl without crushing action.

Cracks River Boulders

But the most severe test of a crusher's "grip" is on water-washed river boulders. They are made from the very heart of the rock, with all rough edges and all soft spots worn away. Two Telsmith breakers are crunching up these boulders at the plant of the Haines-port Mining & Transportation Company, corner Beach and Berk Streets, Philadelphia, Pa. You need Telsmith's structural strength and "parallel pinch" to break river rock.

Smith Engineering Works

3188 Locust St.
Milwaukee, Wis.

545 Old Colony Bldg., Chicago, Ill.
30 Church St., New York City
710 Witherspoon Bldg., Philadelphia
Garfield Bldg., Cleveland, O.
Franklin and Channing Aves., St. Louis, Mo.
325 W. Main St., Louisville, Ky.

BROWNING

"BUCKETS THAT BITE"

Browning Reeved Type Bucket

The best "trademark" of this bucket is the smooth, clean flat path which it leaves in its wake—a proof of its ample power and scientifically correct design.

A BUCKET—to be profitable to you—must be designed and built by practical men. It must be designed so that it will "bite" a full load on each trip. Failure to do so means a direct loss to you on each trip of the bucket.

Most buckets look alike—but there's a vast difference in them. There are, in fact, many points of difference, but they all merge into one in the end—the difference in profits to you.

Here are the main points where the Browning Bucket will increase your profits; it is quick-acting—this means more trips in a day: it grabs a full load each time—this means less trips for a given quantity of material: light in weight, it costs less to lift it each time. Light in weight but strong in construction, it saves itself from destructive strains: it is thoroughly lubricated, preventing unnecessary wear and increasing its life.

Browning Flat Chain Clam Shell Bucket

A quick-detachable bucket of splendid digging power. May be equipped with teeth. A husky, long-lived, hard-duty bucket.

Browning Coke Fork

Originally designed for use at ovens and blast furnaces, it has proved equally popular for handling straw, manure and garbage.

"There's a Browning Bucket for every purpose"—send for Bucket Catalog describing each bucket in detail—it's free if you write on your business letterhead.

The Browning Co.

Cleveland, Ohio

Sales Offices: New York Chicago

Browning Wood Grapple

The instant popularity of this grapple in pulp-wood and lumbering districts is ample proof of the efficiency of this new idea in lumber handling.

Prompt attention will be given your inquiry if you mention ROCK PRODUCTS

Proof

SIZE of crusher: 48 inches. Material crushed: limestone. Length of time operated: three years. Size of feed: 4 inches. Size of product: 1 1-2 inches. Horsepower used: 65. Tons crushed per hour: 80 to 100. Tons crushed per set of discs: 750,000. Time lost on account of breakage: none.

Size of crusher: 24 inches. Material crushed: gravel and hard heads. Length of time operated: 2 years. Size of feed: 2 inches. Size of product: 1-2 inch. Horsepower used: 20. Tons crushed per hour: 25. Original crushing discs still in use. Time lost on account of breakage: none.

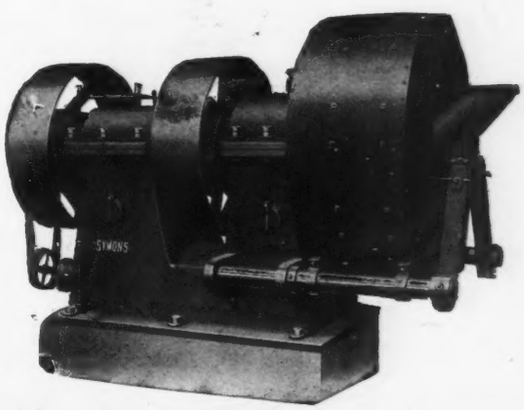
SYMONS
DISC CRUSHERS

earned the above records. Names of quarries will be sent upon request.

Symons Crushers are primarily designed for secondary crushing, but where the feed is not larger than 6 inches, the 48-inch size performs with true Symons success as an initial breaker.

The margin of strength in the secondary crusher that makes it successful in first-stage work is your insurance of super-strength.

We will be pleased to help you satisfactorily solve your crushing problems.



CHALMERS & WILLIAMS
1425 Arnold St. Chicago Heights, Ill.

To say you saw the ad in ROCK PRODUCTS gives tone to your inquiry

Traylor "Bull Dog" Gyratory Crusher

JUST let a Traylor "Bull Dog" clamp its jaws on a bunch of "hard-heads" or trap-rock. Crunch, crunch, crunch—and it is all over. Handles the hardest stone as though it were chalk.

Why? Because the eccentric is both longer and of greater diameter than any other. Its force is irresistible.

But there are other features. For one thing, the shaft is much shorter and one hundred per cent stronger than standard gyratory shafts.

Ever experienced trouble in lubricating? Not if you've used Traylors. They have the positive force-feed lubrication system.

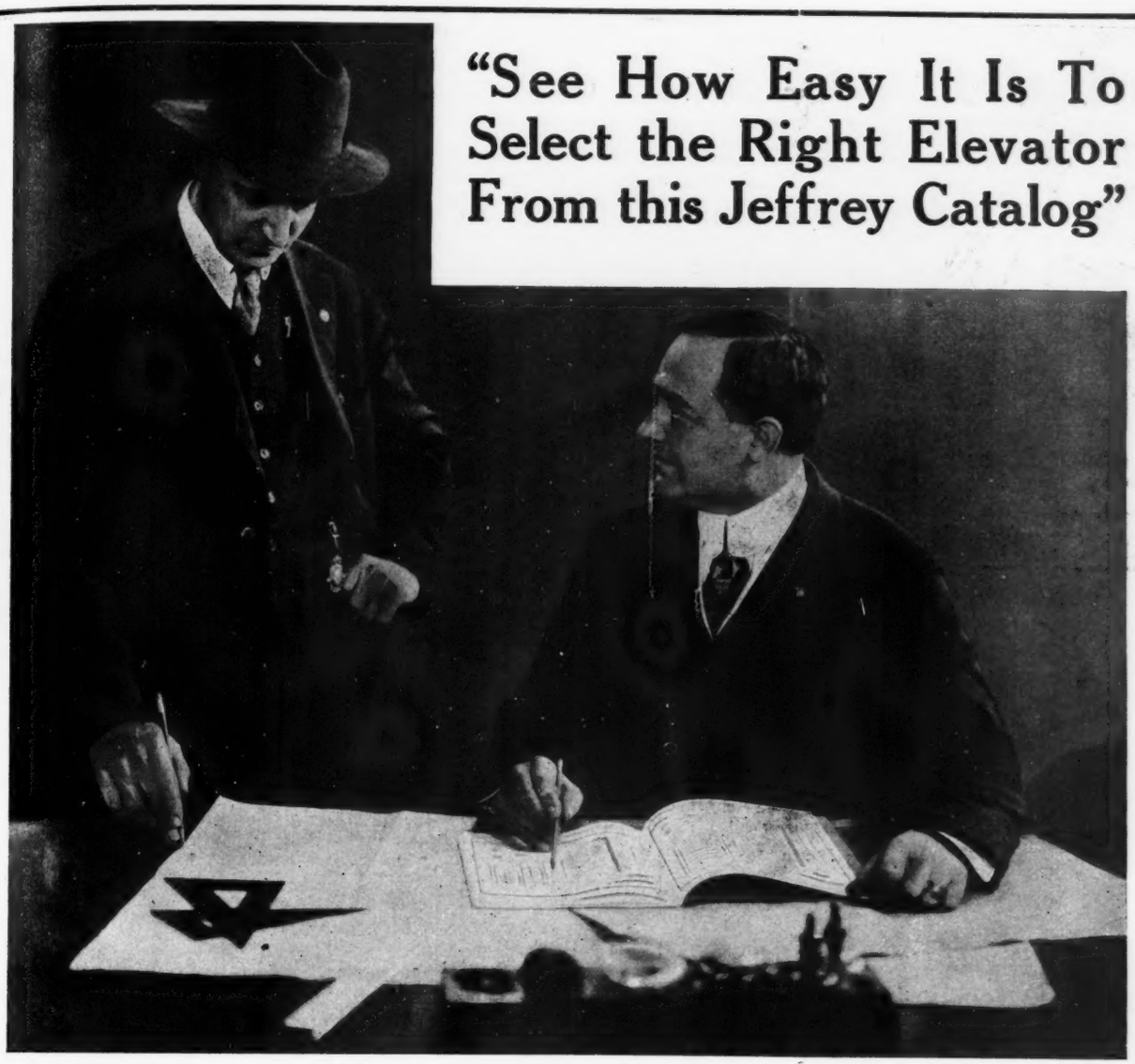
And the entire construction tends to reduce up-keep to a minimum—increase production to a maximum—and to go easy on power.

We make all kinds of Crushers. Tell us what you are in the market for and we will send you specific literature.

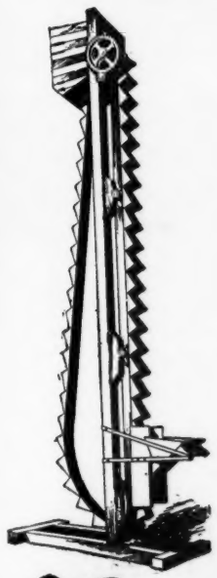
Traylor Engineering & Mfg. Co.
Allentown, Pennsylvania

NEW YORK 30 Church Street | LOS ANGELES Citizens Bank Building | CHICAGO Fisher Building | SPOKANE Mohawk Block

The advertiser wants to know that you saw his ad in ROCK PRODUCTS.



"See How Easy It Is To Select the Right Elevator From this Jeffrey Catalog"



Chief Engineer:

"Here's a chance to save money on that new Elevator you need. All you need to do is to pick out the **number** of the Elevator from this Catalog and give me the **feet centers** and I'll wire **Jeffrey** for Price and Delivery. We can save the time and expense of making up new drawings and lay-outs."

Catalog No. 244-E showing the advantages of using Jeffrey Standardized Elevators, should be in the hands of every Engineer, Contractor or Manufacturer. Send for copy.

The Jeffrey Manufacturing Company

935 North Fourth Street

COLUMBUS, OHIO

Handle it Mechanically

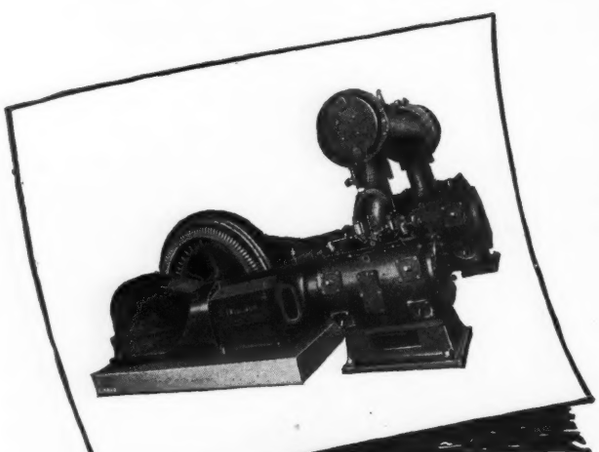
Saying, "I saw it in ROCK PRODUCTS," will bring quick action

Another Leaf from the Worthington war book

FOR the most part, Worthington's vital share in forging the American war machine was carried on in "third-line trenches"—in the countless factories and shipyards, or at mines or farms three thousand miles from the front.

But in a few instances Worthington went forward with our troops. Worthington Compressors, made by our Laidlaw Works, for example, were employed in filling cylinders with compressed gas for inflating balloons. Other Worthington Compressors found varied use on our ships of war, from clearing the big guns of gas to emptying flooded compartments or operating machine tools. It was our Laidlaw Works, indeed, which supplied over a hundred compressors for Uncle Sam's new destroyers.

And so throughout the whole big Worthington organization. All the facilities of our eight factories were employed wherever they could speed up war work, and the long list of products delivered—to our government, to military forces, and to industry—constitutes for us both a sweeping endorsement of Worthington quality and a proud roll of honor.



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Executive Offices: **115 Broadway, New York City**
Branch Offices in 24 Large Cities

PRODUCTS FOR MILL AND QUARRY
Air Compressors, Gyratory and Jaw Crushers,
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Rock Products

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542 SOUTH DEARBORN STREET
CHICAGO

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Editor

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Table of Contents

Editorial—Prices in Rock Products Industries 13
"Cleaned and Screened" Aggregates 14
Plant of the Wisconsin Sand and Gravel Co. 15–17
Requisite Qualities and Testing of Molding Sand 18–20
Costs in Silica Sand and Coal Operations Compared 20
Plant in Canada to Manufacture Soda Ash 21
Hints and Helps for the Plant Superintendent 22–23
Lime Report of the Pennsylvania State Chemist 24–25
Lime and Cement Industry of England 26–27
Plant of the Columbia Quarry Co., Illinois 28–33
Knoxville Agricultural Lime Conference 33
Architects Predict Higher Building Costs 34
Public Opinion on Road Material Prices in Illinois Changes 35
Sand and Gravel Associations Add Engineer to Staff 36
New Equipment—World's Largest Crusher 37
News of the Rock Products Markets 38–39
Wholesale Prices Crushed Stone, Agricultural Limestone 40
Wholesale Prices, Sand, Gravel and Silica Sand 41
News of the Rock Products Markets 42–43
Passed by the Screens 44–45

ALPHABETICAL LIST OF ADVERTISERS

Aero Pulv. Co. 47
Aetna Explosives Co. 4
Allis-Chalmers Mfg. Co. 54
American Process Co. ..... Inside front cover
American Pulv. Co. 55
Audubon Wire Cloth Co. 56

Ball Engine Co. 51
Beaumont Co., R. H. 49
Browning Co. 6
Buckbee, J. C. 51
Byers Machine Co., John F. 47

Caldwell, H. W., & Sons Co. 50
Chalmers & Williams 7
Chicago Perforating Co. 47
Classified Advertising 45
Continental Car Co. 47
Cross Eng. Co. 51

Dunning & Boschert Co. 48
Du Pont, E. I., de Nemours & Co. 54

Ehrsam, J. B. & Sons Mfg. Co. ..... Inside front cover
Erie Steam Shovel Co. 51

Fuller-Lehigh Co. 50

Gifford-Wood Co. 50
Good Roads Mach. Co. 59
Gruendler Crusher & Pulv. Co. 47

Hendrick Mfg. Co. 57
Huron & Wyandotte Port. Cement Co. 46

Imperial Belting Co. 12

Jaite Co., The ..... Inside front cover
Jeffrey Mfg. Co. 9
Johnston & Chapman Co. 49

K.-B. Pulverizer Co., Inc. 51
Kennedy-Van Saun Mfg. & Eng. Corp. 52
Kissel Motor Co. 55

Leschen, A. & Sons, Rope Co. ..... Inside back cover
Lima Locomotive Co. ..... Inside back cover
Loomis Mach. Co. 53

Mayer-Hasseldiek Co. 48
McMyler Interstate Co. 52
Miscampbell, H. 49

National Eng. Co. 53
Nortmann-Duffke Foundry Co. 47

Ohio Locomotive Crane Co. 47

Pennsylvania Crusher Co. ..... Inside front cover
Phoenix Wire Wks. 48
Portable Mach. Co. 60

Roebling's Son Co., John A. 53
Ruggles-Coles Eng. Co. ..... Inside front cover

Sanderson Cyclone Drill Co. 52
Sauerman Bros. 48
Schaffer Eng. & Equip. Co., The 57
Smith Eng. Works 5
Steacy-Schmidt Mfg. Co. ..... Inside front cover
Stephens-Adamson Mfg. Co. 56
Sturtevant Mill Co. 2

Toepfer Sons Co., W. 47
Traylor Engineering & Mfg. Co. 8
Tyler, The W. S., Co. 3

Universal Crusher Co. 49
Urschel-Bates Valve Bag Co. ..... Back cover
Used Equipment 46

Vulcan Iron Works 52

Waterbury Co. 58
Watt Mining Car Wheel Co., The ..... Inside back cover
Webb City & Carterville Foundry & Machine Co. 50
Webster Manufacturing Co. 48
Weller Mfg. Co. 59
Worthington Pump & Mach. Corp. 10

Yates, Preston K. 48

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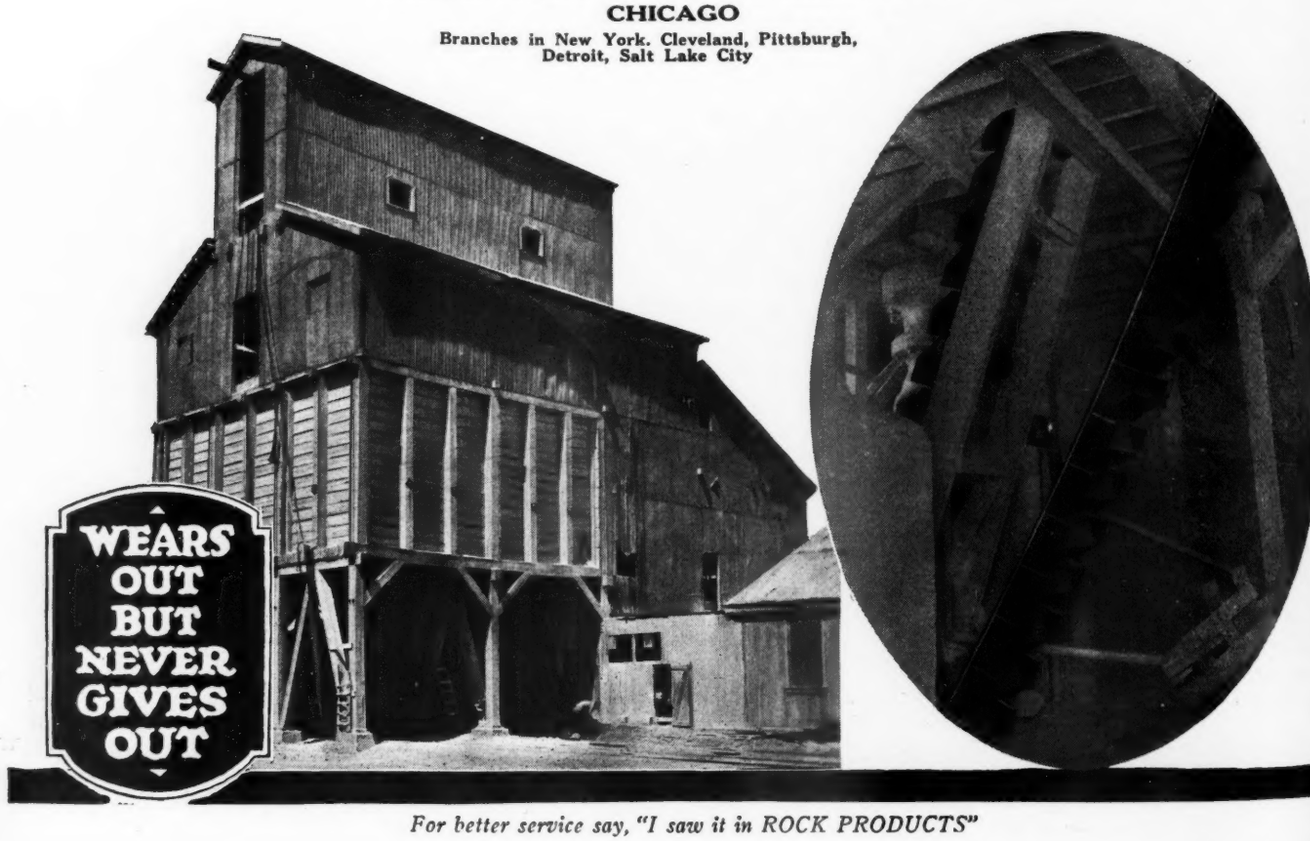


For better service say, "I saw it in ROCK PRODUCTS"

Rock Products

Vol. XXII | Chicago, May 10, 1919 | No. 10

Prices in The Rock Products Industries

Little Hope of Government Price-Fixing; Keenest Competition Must Prevail—But Let It Be Intelligent Competition—Therefore Know Your Costs

THE LONG-DRAWN-OUT controversy between the Industrial Board of the Department of Commerce and the Railroad Administration is ample evidence of the difficulties involved in any attempt at general price-fixing. The fact that since the scheme of Government price-fixing or stabilizing was initiated some prices have declined has done much to weaken the plan as a whole. But so far as raw building materials go there now seems more likely to be increases, as the demand increases, than any general reductions. Price-fixing might thus react to the detriment of the producer instead of the consumer.

Probably any such scheme is bound to fail sooner or later; first, because it is a practical impossibility for any authority to determine what a fair price under all conditions really is, and second, because it would be practically impossible to hold all the producers in line if a price were fixed. It is not unlikely that the Railroad Administration already knows it can buy steel for less than the fixed price, or that some one or more of the big steel producers is behind the Railroad Administration's stand.

With the biggest and best organized American industry in this plight, what will happen in the more recently and less thoroughly organized industries in the rock products field? In the case of the mineral aggregate industries the Industrial Board of the Department of Commerce has already stated in effect that the old-time conditions of unrestricted competition are so persistent as to prohibit the possibility of any attempt to fix prices. The same conditions exist to greater or less degree in all of the other rock product industries, because these materials are so widely distributed and so easily produced (comparatively speaking) that any attempt to fix or control prices in an arbitrary manner would not hold water with the producers themselves for any considerable time.

Up to the Individual Producer

The whole matter of fixing a price for his product is thus thrown up to the individual producer and probably not a few are in the dilemma of the Virginia lime manufacturer who wrote to another Virginia lime manufacturer as follows:

Indian Rock, Va., April 7, 1919.

Mr. Wm. E. Carson, Riverton, Va.

My Dear Carson:

Business conditions, particularly in connection with the stability of prices, seem to be very difficult at this time, particularly in view of the fact that one part of the Government is urging us to maintain our present wage scale and another section of the Government to lower our prices on lime; while another has sent out a statement we must realize we have now reached a higher price level and must maintain it. I would like to know that your viewpoints on these matters are?

Yours truly,

L. L. DILLON.

Mr. Carson's answers to these questions were so apropos to the state of mind of all producers in the rock products industries that they were published in full on page 31 of ROCK PRODUCTS of April 26. Mr. Carson, as the following letter shows, however, wishes it understood that the matter published was contributed by him as an individual. ROCK PRODUCTS so accepted it and published it for the benefit of all rock products producers, merely wishing to emphasize the fact that the man who had written it had the benefit of a broad point of view. He writes:

Sir—In your issue of April 26, 1919, you re-printed a letter that I addressed to Mr. Dillon of Indian Rock, Va., in reply to certain questions he asked me. I do not object to the printing of this letter provided it appears as coming from me, personally, but at the head of the article it appears as follows: **"President of Lime Association on Prices."**

In view of the fact that through the By-Laws of the Association and by the action of the Executive Committee, any of its officers, as such, are prohibited from considering any questions relating to prices or price-fixing, I ask you to state specifically in your next issue of ROCK PRODUCTS, that this article was headed incorrectly and was not the action of the President of the Lime Association in any way, shape or form.

Yours truly,

(Signed) WM. E. CARSON, President,
The Lime Association.

Mr. Carson's long and intimate knowledge of the lime industry as a whole doubtless prompted him to call the attention of his friend to some of the pitfalls of destructive competition, just as ROCK PRODUCTS has tried to do for many years.

Must Know Actual Costs

Since rock products producers must preserve their investments, make a living, pay war wages and war prices for steel and equipment, they must naturally avoid falling into the trap of indiscriminate and ruinous price-cutting, not only for their own good but for the good of their employees and the country as a whole.

The Government having passed the buck to the individual producer in such a contradictory way, he is naturally in a quandary to know which way to turn. He will be safe only if he knows *what his actual costs are*. That has been the great weakness in the rock products industries and always will be a weakness until every operator and prospective operator is educated to the point of finding out *all* his actual costs before underselling the other fellow. No business man is insane enough to give away the capital he invests in any enterprise he expects to earn a living from. And that is just what the operator does who fails to know his costs and set a price to cover them with a fair profit.

Mr. Carson is to be commended for his frank analysis of the situation, because frankness and open-handedness are the only things which are bound to win under the industrial conditions of the present and future, both in dealing with the public and with labor.

Can You Guess Who This Poet Author Is?

"Come, Now, and Let Us Reason Together—Another Word on Prices"

Come, Limies, gather 'round and hear,
A song that's sung by persons queer;
Who want their nuts raked out the fire
While to the back ground they retire.

"Reduce your prices low," they say,
But higher wages you must pay,
And if a loss you make don't kick,
For this will start up building quick.

And thus the building boom will move,
And all their curious theories prove;
That price controls in making sales,
And lime price falls or building fails.

Into the cost of building done,
Not two per cent our lime does run.
And yet to make the building cheap,
They talk, and talk, and talk a heap.

That we must jump into the breach
And do our best the builders teach,
That we will work and run at loss,
That they a profit quick may toss.

They hope this bait we'll take and land,
Like suckers without brains or sand,
And help the steel and lumber trust,
While we go in the discard bust.

We know there is a time and tide,
When every business man is tried,
And if he is of sterner stuff,
That can't be shaken by a bluff.

But tightly sits until the time
There is a market wide for lime,
And has a price established, well—
Then living is not "Merry Hell."

But if he breaks his price like cheese
He cannot hope to live in ease,
And drink and eat as others may,
Who for their goods exact fair pay.

And when he comes to die and go,
Not one red cent he has to show
For years of work and labor done
When he a fortune might have won.

So stiffen up your chin and back,
And don't let down in the attack.
When theoristers or dealer try,
A lower price from you to pry.

Enough is said, be wise, be firm;
Sit tight; the tide will surely turn;
And then the price that's made will hold—
Be strong! be patient and be bold!

—W. E. C.

"Cleaned and Screened" Aggregates

A CHAIN IS NO STRONGER than its weakest link. There is no use binding fragments of stone and sand with cement into concrete, if the stone and sand themselves are worthless.

A mineral aggregates plant can not prosper, any more than any other commercial institution, if its merchandise does not stand the tests of service.

Moreover, no business man will invest his money in a mineral aggregate deposit and plant until he and his associates are convinced that the material will serve its purpose satisfactorily.

Therefore, when mineral aggregates are purchased of a commercial producer the purchaser has certain knowledge that they have been tested and proved.

So when the purchaser is a business man he buys of a reputable producer. But when the purchaser is a public official with an uncertain term of office, he too often likes to experiment at the public expense.

Thus many miles of road are ruined in the making because some inexperienced official or contractor wants to do a little experimenting. It's up to mineral aggregate producers as an industry to see that as little experimenting as possible is done in the future.

"Sand and Gravel" or "Gravel and Sand" —or Crushed Stone Plant?

Wisconsin Sand and Gravel Co. Operates Boulder-Crushing Proposition With Sand As a Side-Line

J. M. CLICQUENNOI, treasurer of the Wisconsin Sand and Gravel Co., Milwaukee, is a firm advocate of distinguishing the difference between a sand and gravel plant operated for sand as the main product and gravel as a by-product and one operated with gravel as its main product and sand as a by-product.

The last is certainly the more unusual operation and this particular plant is perhaps at the head of this class in the proportion of gravel to sand—75 per cent over ¼-in. material, 40 to 60 per cent of which is crushed boulders, or perhaps, crushed stone, although for sentimental reasons, apparently, sand and gravel producers like to avoid that term.

This plant is located at North Lake, about 30 miles northwest of Milwaukee. The plant is situated on a sidehill which permits several advantages in the method of operation. The opening into the deposit is made approximately at right angles to the axis of the plant, this opening being about opposite the foot of the main conveyor-belt incline.

Steam-Shovel Pit Operation

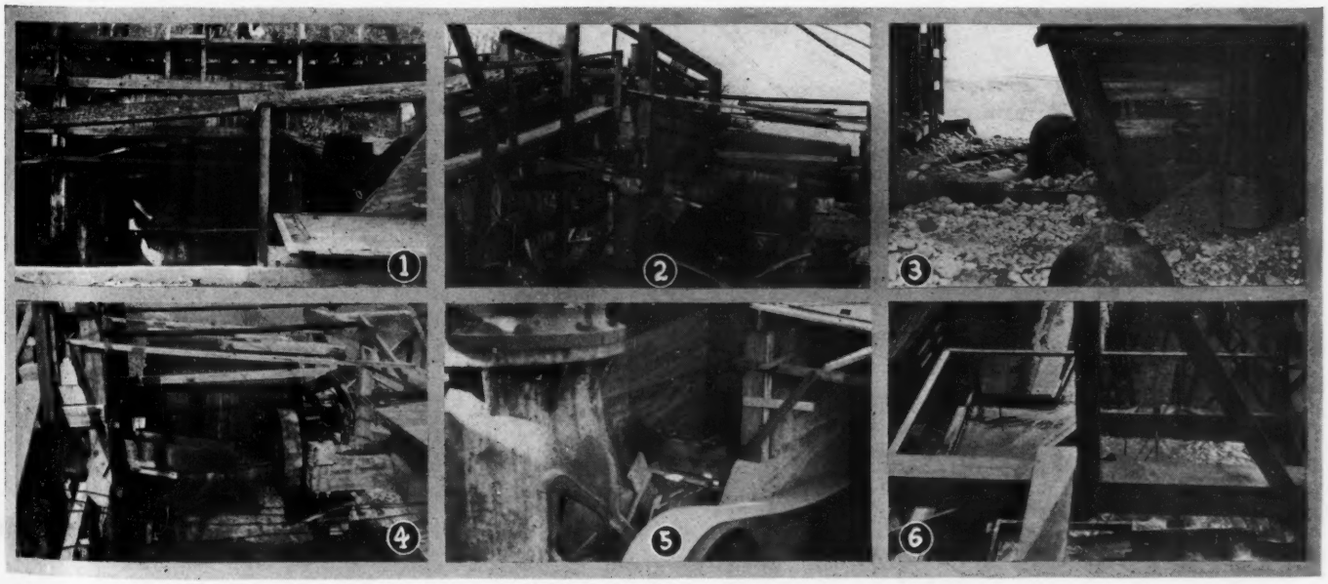
Until this season the two steam shovels were used in the cut in connection with a belt conveyor running from the pit to the crushers at end of the inclined main belt conveyor of the plant. The smaller (1 yd.) shovel was used chiefly to clear the way for the second (1½ yd.) shovel which loaded a movable hopper feeding the conveyor out of the pit.

As one of the accompanying views illustrating the character of material clearly indicates, a great many boulders were encountered which rendered this scheme of operation extraordinarily difficult. It was necessary to keep several men in the pit to break up the smaller stones with sledges, while the larger and equally valuable ones were thrown aside.

Last fall and winter the plant was redesigned and reconstructed by adding a No. 12 gyratory crusher (one of the two largest in gravel plant operation) and building a new conveyor belt unit on the axis of the plant extended. The two No. 5 gyratory crushers formerly used as the primary crushers are by the new arrangement converted into secondary crushers without changing their location or setting.

Railway Pit for Operation

The material is now moved out of the



(1) No. 12 gyratory crusher—one of two of this size in gravel plant operation; (2) Biesanz screens, showing one screen in place and shaft and spout of another; (3) Secondary crushers; (4) Another view of screens, showing sand pan; (5) No. 12 crusher pit; (6) Sand-settling tanks

pit to the plant by a standard-gauge railway and a 25-ton saddle tank locomotive with either side dump (30 yd.) or bottom dump cars (40 yd.). The track comes out of the cut on a curve and its lower end is built over a concrete tunnel containing the end of the belt conveyor and over the dumping trestle built above the big primary crusher.

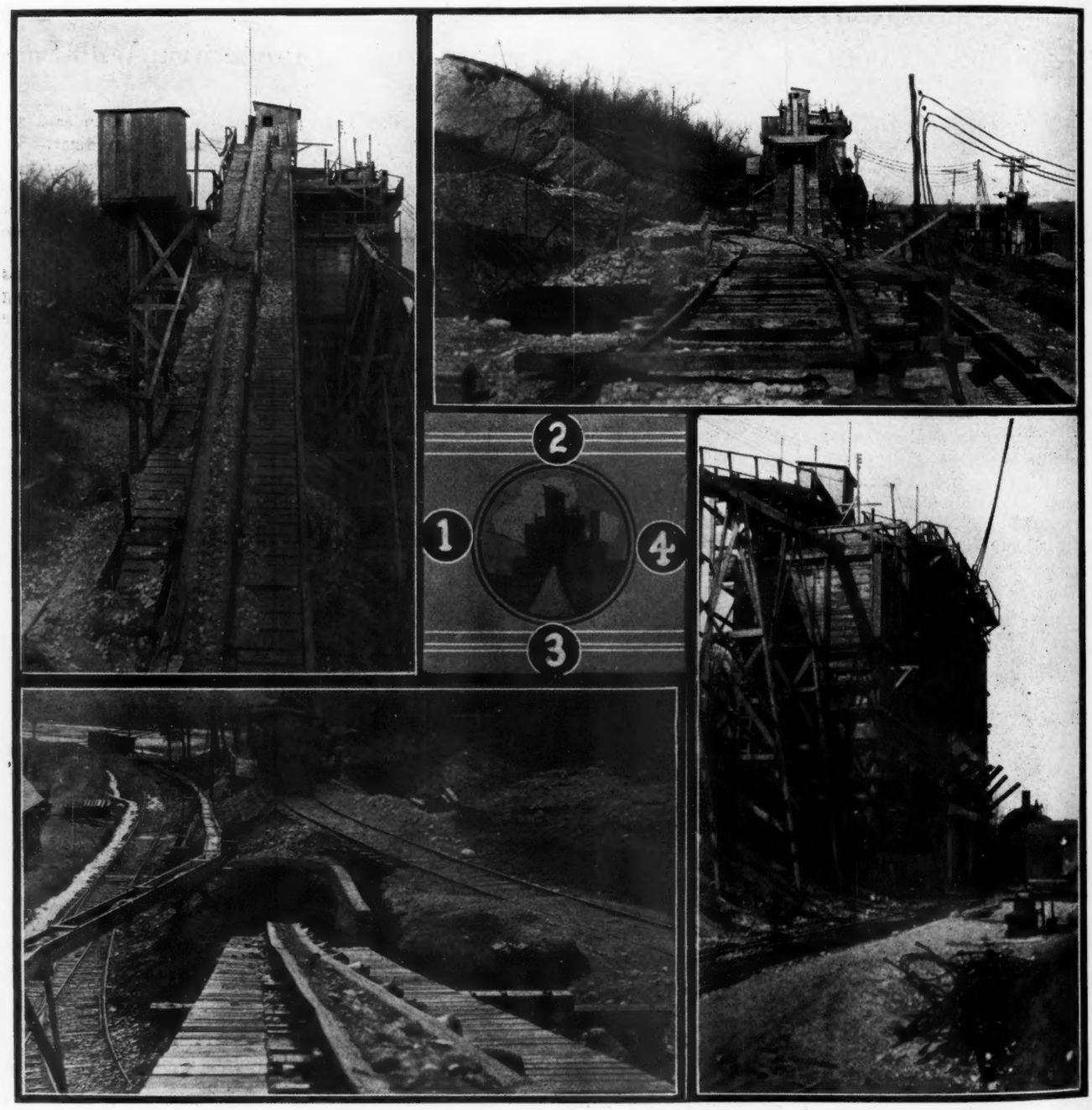
Crusher Arrangement

The bottom dump cars dump through the floor of the trestle directly into the mouth of the crusher. The side-dump cars, now in use, dump to a banked opening on the upper side of the crusher and the crusher is fed through a controlled gate constructed on the principle of a flap valve—a door hinged at the top with the opening controlled by the tightness of a chain drawn across the lower half of the door. The tension in the chain is applied by a brake-handle operated windlass like the hand brakes on a freight car.

The crusher is placed in a concrete-lined pit and discharges through a hopper to the 160-ft. belt-conveyor, leading to the top of the secondary crusher house. Here the material goes over a grizzley, the over-size going to bins which feed one or the other of the two secondary crushers and the other material going direct to the main belt-conveyor 192-ft. long. Both the raw material conveyors mentioned are 30-in. 8-ply canvas belts.

Screening and Washing

The material as it falls from the end of the main conveyor is diverted to three chutes or spouts which feed directly, or by means of a short supplementary conveyor, four sets of Biesanz screens. These screens consist of four conical screens mounted on the same horizontal axis or shaft, one within the other, and discharging the different sizes at both ends into narrow openings to the bins below. The rejections from this battery of screens go to four No. 3 gyra-



(1) Main conveyor to screening and washing plant; (2) Track over dumping hopper of No. 12 gyratory; (3) Tunnel for conveyor from big crusher; (4) Storage bins and loading track

tory crushers, set in a row, the discharge from these crushers being conveyed by a 160-ft. belt-conveyor to a point about one-half way up on the main conveyor.

The sand and wash water which passes all the screens falls into a steel pan chute extending under the whole battery of screens, which are mounted in series on parallel shafts, and is thus conveyed to two sand-settling tanks, the first of the automatic discharge type for coarse sand and the second with hand-operated valves for the fine sand. The waste water is conducted by a wood flume to a settling pond where it is pumped up again and re-used.

Except the steam shovels and locomotive all power is furnished by electric motors, requiring about 500 h. p. in all.

Products and Storage Facilities

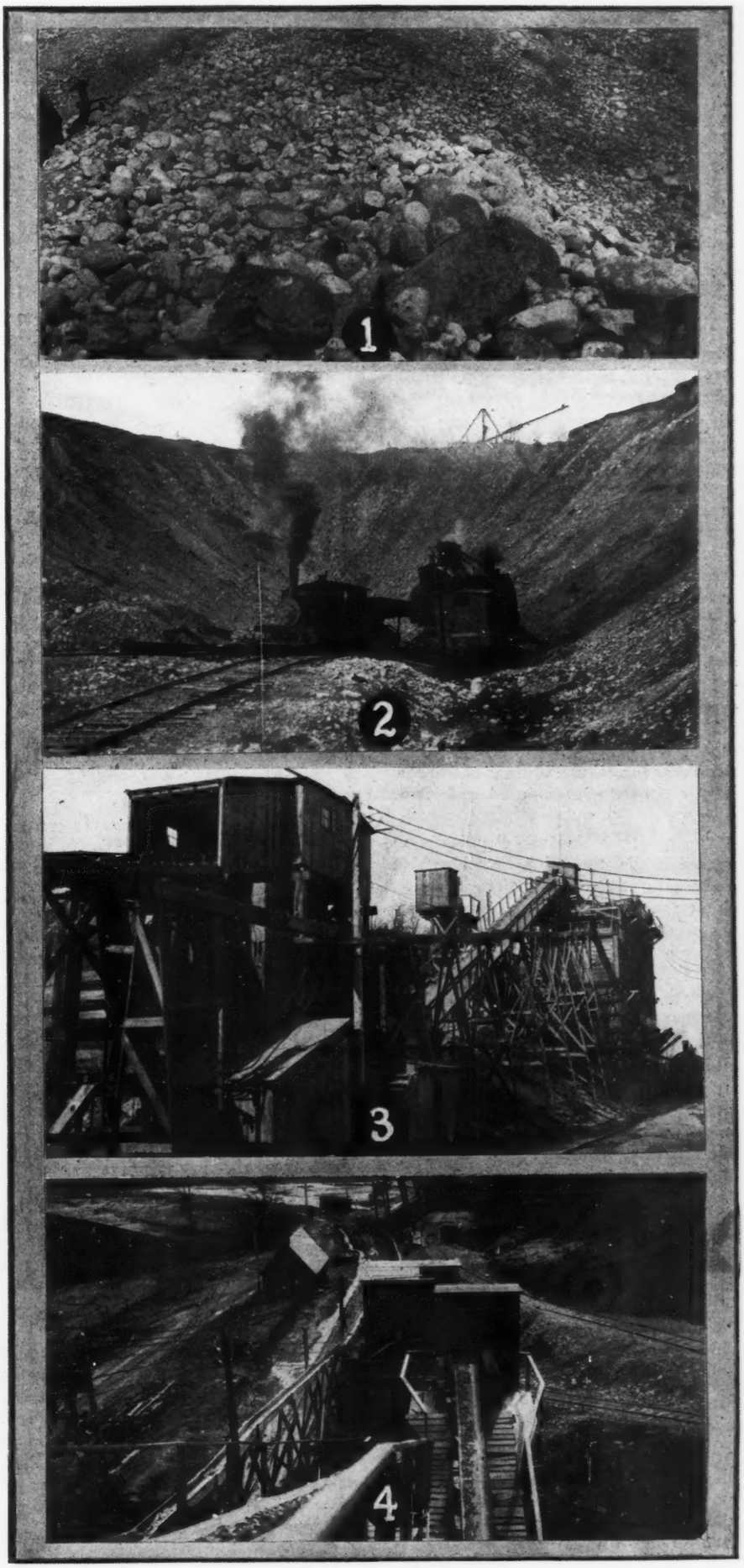
The following grades and sizes of material are produced: plaster sand, concrete sand, roofing gravel, ¾-in. down, 1¼-in. down and 2-in. down. As already stated between 40 and 60 per cent of the plant output is crushed material. The deposit never produces sand enough to supply fine aggregate for the amount of coarse aggregate produced.

Bin storage is provided for about 25 cars or 1,000 tons. Stock-pile storage is provided for 10,000 tons. The stock-pile is made and loaded out with a locomotive crane. The capacity of the plant is about 2,000 tons per day and more than enough trackage facilities are provided for storing 50 cars. The cars are dropped down to the plant by gravity, and when loaded are released and run by gravity down the plant siding almost to the connection with the main line—a distance of nearly 1,000 ft. The plant now has connection with one of the principal railways serving the territory northwest of Milwaukee and will eventually be connected with the other.

Officers

L. A. Garrity has been the superintendent of the plant since it was built and has worked out many of the details of construction and operation.

I. M. Clicquennoi, who has charge of both operation and sales, is a civil engineering graduate of Purdue University, Indiana, and for several years was a concrete road promotion engineer with the Universal Portland Cement Co. He is secretary of the Wisconsin Mineral Aggregate Association, to the organization of which he devoted much time and effort.



(1) Character of the "gravel" mined; (2) View of pit operation; (3) General view of plant, secondary crusher house in foreground; (4) View of concrete dumping hopper from top of plant.

The Practical Analysis of Molding Sand

Selection According to Physical Qualities and the Nature of the Work—Sieve Tests —The Perfect Sand

F. Albert Hayes
Butler & Hayes, Inc., Experimental Engineers, 220 Devonshire St., Boston, Mass.

ANY SAND IS NOT SUITABLE for green sand mold—certain very definite qualities are requisite. It has been my privilege to see a few men who could feel of sand and instantly determine its foundry availability, but few are endowed with such discernment, and therefore there have been developed other methods somewhat more scientific for the determination of the qualifications of sand.

Inasmuch as the qualities of the sand are dependent on the origin, a consideration of this subject is enlightening. Nature has stored up vast quantities of sand in beds formed through the decomposition and disintegration caused by the weathering of granite or similar igneous rocks. Thus we are back to the early periods of structural geology, for such rocks were the first to be formed and are the parent substance from which other rocks and sand are formed. The original granite consisted of quartz, feldspar, and mica or hornblend. By the action of frost, water, and similar natural agencies, the feldspar has become wholly or partly decomposed, and formed clay.

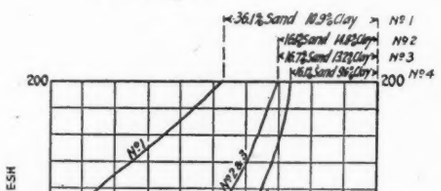
The quartz grains are chemically unaltered while the mica and hornblend are usually decomposed. The decomposition product is, then, a sand consisting of quartz grains occasionally mixed with mica both partially or wholly covered with clay. It is apparent that the properties of sand will vary tremendously, depending on the violence and extent of the weathering process.

An ideal molding sand would necessarily be a synthetic product. Dr. Richard Moldenke states in his admirable volume, "The Principles of Iron Founding," that his definition of an ideal molding sand is one consisting of uniform-sized, rounded grains of silica, each grain evenly coated with the thinnest necessary layer of the most refractory and fattest clay to be had. This is a theoretical ideal, but it is an undoubted aid in the comparison of actual sands, and helps to arrive at certain qualities which sand must possess to be suitable for green sand molds.

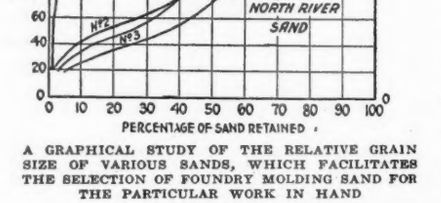
Proper Requirements

A mold when made up must be sufficiently rigid and strong to confine the molten metal to the exact limits of the mold without alteration in shape; it must allow the steam and gases to escape readily; and it must resist the fusing action of the liquid metal. These three major requirements may be further subdivided as follows:

(a) Rigidity.
  Bond of clay.
  Size, and shape of grain.
(b) Permeability.
  Porosity.
  Quantity of clay.
  Size and shape of grain.
(c) Refractoriness.
  Quality of clay.
  Quantity of clay.
  Size of grain.



A GRAPHICAL STUDY OF THE RELATIVE GRAIN SIZE OF VARIOUS SANDS, WHICH FACILITATES THE SELECTION OF FOUNDRY MOLDING SAND FOR THE PARTICULAR WORK IN HAND



Rigidity and Bond

This ability of molding sand to resist strain after forming is dependent on the shape of the sand grains, and also bears a very close relation with the bond of sand. It is apparent that sharp, angular and flat-sided grains will interlock and form a stronger mold than rounded grains, but unfortunately such interlocking seriously reduces the facile escape of gases. It is also a fact that ramming of such sand produces a less evenly packed mold than do round grains, due to the more perfect distribution in all directions of the force of the rammer by the latter shape. This quality is also intimately connected with the amount of tempering water used, the proper amount of which is determined by the quantity and condition of the clay. Rigidity should be secured by the bond of the clay rather than by dependence upon sharp sand.

The power of clay to stick the grains of sand together depends on its content of fatty or sticky clay. The formation of the clay has been effected by the decomposition of the feldspar which consists of silicates of aluminum and the alkalis contained in the original granite. Through weathering, the aluminum silicates have taken up water in chemical combination and to greater or less extent the other silicates have been decomposed and washed away in solution. The more completely the formation of the hydrated aluminum silicate, the greater the bonding power of the clay, for it is this constituent which is naturally sticky. Thus a sand containing a small percentage of fat clay may have as good a bonding power as one containing a large amount of poor clay. The necessity of sufficient bond in the new sand is well understood, but it is too frequently the case that the floor sands receive very little attention in maintaining the bond within the necessary limits. The fatness of the clay is destroyed by contact with the hot iron in the molds, and care should be exercised in shaking out the castings to see that the minimum of burned sand is returned to the pile.

Permeability and Porosity

Porosity is the term applied to the spaces existing between individual grains of sand. The proper venting of sand, or the ease with which steam generated from contact with the molten iron with the mold or gas liberated at the moment of setting can escape through the mold is dependent not alone on the porosity but also the permeability. This can be described as the shortest linear distance through the pore spaces between the grains from one side of a unit volume of sand to the other. That is, a sand may be porous but because of the shape and size of the grains, there may

* Reprinted from "Iron Age," Mar. 20, 1919, by special permission.

be no communication between adjacent pore spaces, and therefore it is not permeable because gas endeavoring to escape cannot find a free passage through the sand. Here again the tempering water and amount of clay are important. It is obvious that a large clay content will tend to fill the pore spaces and diminish the venting qualities. Each additional quantity of water also tends to reduce the permeability. It also markedly affects the bond and consequent rigidity, and, as already noted, it is essential that the tempering of sand be carefully controlled. Experiments reported in "The Iron Age," vol. 94, pp. 544-6, indicate that 4 per cent of water is the average requirement to give maximum strength, and that increasing the tempering water 50 per cent decreases the strength 35 per cent. Dr. Moldenke also shows the same tendency with the exception of fine sand where "the higher water averages seem to serve best, which is natural when the greater surface areas to be covered are considered."

A series of water tests were made from several floors on which the same sand was used and the same general class of work was molded. All the sand was mixed by a sand cutter, but the individual molder tempered his own sand. This was explained by the superintendent, who said that each molder rammed the sand to different densities and so was allowed to moisten the sand to an extent that was satisfactory to him. In view of this, the following results are interesting, and form a valuable instance of the necessity of elimination of the personal element and the standardization of processes:

Per Cent Moisture

Pile Number	1	3	3	4
First day	4.79	4.14	5.18	5.58
Fifth day	5.41	7.14	6.07	5.93
Tenth day	4.20	7.91	6.47	7.06
Pile Number	5	6	6	8
First day	5.63	6.11	6.45	5.13
Fifth day	4.82	5.94	6.46	6.78
Tenth day	...	...	...	...

Note the minimum is 4.14 per cent and the maximum 7.91 per cent. Unfortunately for the superintendent's explanation, the maximum and minimum happened to be with the same molder. It is obvious that uniform results cannot be expected when it is considered that the higher percentage, as well as reducing the bond and consequently the rigidity, decreased permeability and also increased the setting rate of the casting.

Refractoriness

The ease with which a mold is broken down after use and the damaged sand is reclaimed is largely dependent upon the quantity of fluxing material in the molding sand, and therefore is closely related to refractoriness. The silica of sand is practically unfusible while the fat clay and aluminum silicate will be unchanged by the heat of molten iron except at the inner mold surface. The residual mica and silicates of the alkalis fuse at very much lower temperatures and also form fluxing materials. Therefore the admixture of these alkali silicates not only reduces permeability but may also reduce the fusing point of the mixture so that cutting of the mold takes place with excessive loss of sand and poor casting surfaces. The fusing points of the various silicates are as follows: Of aluminum 4350 deg. fahr., magnesium 3960 deg. fahr., calcium 3810 deg. fahr., iron 3270 deg. fahr., sodium (alkali) 1500 deg. fahr.

Examination of this table shows that the presence of the alkali silicates will cause sintering and sticking of the metal to the mold, and also cause further loss of sand by the more ready penetration of the heat into the molds. A very excellent check on this factor is the determination of the amount of sand used per ton of castings of a given classification. This figure varies a great deal in foundries, showing that either the sand is deficient or the practice is poor.

The grain size of the sand necessarily bears a relation to the size of the casting poured. A small casting can take a fine sand, as there is little venting required, but on the larger castings, smoothness of the surface must be subordinated to venting, and therefore a sand with larger grain size must be used.

The analytical methods of determining the forging points are of interest, but it is not the purpose to discuss them here. It will suffice to state that the so-called "rational analysis" in connection with sizing test and possibly microscopic examination furnishes practical information for the foundry. A rational analysis reports the percentage of clay, quartz, and feldspar, and the relative fatness or bond of the clay, together with a sizing test. The use of specification in the purchase of sand is practical, while the floor sand can be best kept up by chemical tests. The following samples are representative of two well-known brands and were actually used in a large foundry:

Analysis of Sands, Dry Basis

	North River				Albany			
Chemical Analysis—								
Name	No. 1	No. 2	No. 3	No. 4	No. 0	No. 1	No. 2	No. 3
Clay	10.9	14.8	13.2	9.6	16.1	6.2	10.3	11.8
Quartz	69.5	60.4	58.4	72.4	71.9	77.6	72.3	70.9
Feldspar	19.5	24.8	28.4	18.0	12.0	16.0	17.4	17.4
Iron oxide	6.7	8.5	9.8	6.2	4.1	5.5	6.0	6.0
Alumina	2.1	3.0	3.4	2.6	2.3	3.5	3.0	2.4
Physical Test—								
20 mesh	0.2	1.0	3.7	5.2	0.4	0.4	1.0	4.9
40 mesh	0.6	6.5	9.9	19.1	0.8	1.3	6.5	22.0
60 mesh	0.6	22.2	16.6	23.1	1.4	5.0	12.7	22.1
80 mesh	1.9	10.7	14.1	8.5	2.6	7.1	8.0	5.8
100 mesh	3.1	8.0	6.0	4.9	1.9	5.7	5.3	2.4
200 mesh	46.6	20.6	19.8	13.5	25.3	41.5	32.6	13.9
200 mesh	36.1	16.1	16.7	16.1	51.5	32.8	23.6	17.1
Bonding value	81.0	77.0	64.0	46.0	77.0	92.0	24.0	42.0
Moisture as received	10.5	6.5	9.1	7.3	8.6	8.2	7.8	10.0

Method of Selection

From the information supplied by these analyses, we must draw conclusions as to which is the sand best adapted to the purpose. The size of the casting will immediately determine the grain size, and this is indicated by the sieve tests. Having once selected the proper size of sand, it is then desirable to choose the one that will give the most rigid mold with greatest permeability and ability to stand the cutting action of the hot iron. A very interesting point is afforded by comparison of the relative bonds of the two No. 1 sands. The Albany has the least clay but the highest relative bond, and other things being equal would be the most satisfactory sand. This must not be construed as a general statement regarding the relative values of these two well-known brands inasmuch as sand banks and shipments will vary considerably. As already noted, the larger the casting, using a green sand in the mold, the coarser the grain size needed. It is far better to have a uniform grain size and the perfect sand would have rounded grains of the same size, thus allowing the maximum venting. The admixture of large percentages of different sized grains tends to packing and filling the voids with smaller particles. The practice of mixing No. 1 and No. 2 or No. 2 and No. 3 sand cannot be too severely condemned, as the only advantage derived is the greater rigidity of the mold gained by sacrificing the superior venting qualities of the uniform sized sand. A sieve test will rapidly grade the sand and these have been reported.

Explanation of Curves

The accompanying curves are found by plotting the percentage of sand that will be retained by a given mesh. The perfect sand would be a straight line parallel with the abscissa, and the nearer this condition is approached, the better the sand. Practically a sand never gains the ideal, but the graph affords very ready comparison. Many founders can grade sand to a certain extent by feel, but the writer has seen many instances of false judgment on the part of experienced men. For instance, the same sample of sand presented at two different times was graded as 1 and 2. Reference to the curves gives explanation, as the No. 1 and No. 2 sands are very similar; but the decision as rendered determined the use on certain floors.

It is natural that the same sand bank should vary considerably in itself, which makes it the more important that carloads should be tested and placed in the proper storage bins or piles. A comparison of three No. 1 sands received at several month intervals is given as follows:

Analysis of Three No. 1 Sands, Dry Basis

Chemical Analysis—			
Clay	7.6	6.2	7.8
Quartz	72.2	77.6	69.1
Feldspar	20.4	16.0	23.0
Iron oxide	3.2	5.5	4.5
Alumina	7.0	3.5	7.9
Physical Tests—			
20 mesh	0.1	0.4	0.1
40 mesh	0.2	1.3	0.2
60 mesh	0.3	5.0	0.4
80 mesh	2.4	7.1	3.0
100 mesh	5.7	5.7	4.9
200 mesh	54.5	41.5	53.3
200 mesh	28.4	32.8	30.1
Bonding value	66.0	92.0	47.0
Moisture as received.	0.9	8.2	0.7

These three are very close, and while it may be generally true that such agreement is secured, there are sufficient exceptions to make careful examinations very desirable.

Dr. Moldenke has published the variation of American sand as:

	Range	Grade Average	Ideal Average
Quartz	58.82—81.38	65.53	84.0
Clay sub.	15.49—24.36	21.73	13.50
Feldspar	3.13—22.16	12.74	2.50

The most serious losses of a foundry are often caused by sand, either by improper use of good sands or by sand actually deficient in quality. Opinion varies radically among founders from casual examination. One will say a sand is useless, another with the same years of experience behind him will declare the sand the finest ever seen. Both can prove a fair case when they give their personal attention to the affair, all of which shows that manipulation is a considerable factor. But such supervision is not given and cannot be given to every molder and every case. We have to deal with practical conditions and available labor.

Precautions

Sand must be standardized as far as practicable method of use made uniform, and the quality of the floor sand carefully kept between definite limits. It is necessary that the bond of the floor sand be kept as low as is commensurate with good work, because constant exceeding of that point indicates undue use of new sand and therefore unnecessary expense. If the bond falls too low, drops, runouts, and other trouble will occur. The logical method of keeping down loss from sand is first to determine what sands are needed, then to buy them under specifications, test the quality of that received, and maintain the quality of floor sand by suitable tests.

Comparison of Prices of Coal and Silica Sand

OPERATION of a small bituminous coal mine and a silica sand quarry compared. Bear in mind that the instrinsic value (value in place based on scarcity of the material) is certainly no greater for coal than for ganister (silica) rock. Data furnished by Wm. Garrison, President of the Fox Silica Sand & Stone Co., Daguschonda, Penn.

COAL	SAND
Present price f. o. b. cars mines $2.75, plus 15 cents selling commission, considered very conservative.	
Coal companies can operate 313 days per year, no interruptions for bad weather, rain, snow, etc.	Sand companies can operate on an average only 200 days per year, because of rain, snow, etc.
Coal companies can get men by offering inside, steady work at uniform temperature.	Sand companies can not offer steady work and men are subject to all kinds of weather, being out in the open.

If a fair price for coal is represented by $2.75 per ton, relatively what is sand worth?

Coal is mined, loaded on small cars, transported to the railway and dumped into a railway car and ordinarily not treated.	Sand is quarried, loaded on small cars, transported to the railway but before being dumped into the railway cars it is treated, i. e., crushed in a powerful crusher which reduces it to about 2½-in. cubes; from there it goes to another machine which reduces most of it to sand, all of this is lifted about 35 ft. (by power which costs money), passed over a screen, washed and rescreened and the coarse particles returned for grinding.
Little or no grit to coal not resulting in excessive wear.	Sand practically all grit and the life of sand-mill machinery is extremely short.

In an unprejudiced way strike a balance, giving credit where credit is due and the sand man will not complain. He only wants fair play.

Lime Association Will Study Total Soil Requirements

THE EXECUTIVE COMMITTEE of the Lime Association has suggested to member companies the advisability of submitting to the association monthly reports showing the total tons of each kind of lime shipped in each state.

It is desired to compile these figures from month to month and to send them to all member companies so that the industry may be informed currently of its progress as a whole. If members knew, for instance, that the shipments of agricultural lime in any section of the country showed this year a marked decrease as compared with similar shipments last year, it would be possible to check the decline by concentrated effort in that particular region. The same is true of chemical and construction lime. Again, it is only by comparing the total tonnage of the country with the corresponding period of the year before that a fair decision can be reached regarding the value of the association's work.

The Lime Association proposes to compile figures showing exactly what this annual demand is in tons in each state. This will be done by securing from the State Experiment Station in each state the acreage of acid land and the amount of lime required through a proper system of crop rotation, to correct this acidity.

With these figures it will be impossible to tell what percentage of this demand is being supplied by the lime industry unless it is known how much agricultural lime is being shipped in each state, and such a tonnage report as is suggested above will point out just what spots in the country are weak in this respect and just how weak they are, and will give the association a definite idea of the possibilities for agricultural lime in each section. In other words, the association will be directing its efforts scientifically and exactly instead of more or less at random, as it must of necessity do now.

Of course, all such reports submitted to the association will be used only for the purposes described, and will be carefully kept in the general offices and treated as strictly confidential.—From the Weekly Bulletin of the Lime Assn.

The members of the Lime Association in the Central West territory met in Chicago, May 7, and decided to establish an office and promotion bureau there.

Plant in Canada to Manufacture Soda Ash

New Limestone Industry for the Dominion—Will Also Produce Commercial Crushed Stone

THE BRUNNER-MOND CANADA CO., LTD., of Amherstburg, Ont., a subsidiary of the Solvay Process Co., Detroit, has completed its plant for the manufacture of soda ash at a cost in excess of $3,000,000.

Ninety-five per cent of the soda ash now produced is manufactured under the process originated by the famous Belgian chemists, Messrs. Solvay, and known as the "Solvay Process." This process, which is the one to be employed by Bruner-Mond Canada, Ltd., utilizes as the principal raw materials, salt, limestone and ammonia.

Up to the present time no soda ash has been manufactured in Canada. For years the English manufacturers, in addition to supplying the English requirements, have furnished most of the soda ash used in Canada, the balance of her consumption coming from the United States. The Canadian use of soda ash, while small at first, has now reached an estimated annual consumption of between 40,000 and 50,000 tons.

Began Construction One Year Ago

Canada's tremendous industrial expansion, even before the war, had reached a point where an independent and steady supply of this commodity was absolutely necessary; the war had simply added emphasis to this situation. To cope with this emergency, Bruner-Mond Canada, Ltd., was organized, and in March, 1917, construction work was started. The importance of furnishing Canada with her own supply of soda ash has been considered so paramount that, in spite of the unprecedented high cost of materials and labor, and the extraordinary difficulties of construction, everything possible has been done to effect the early completion of the plant.

Amherstburg, Ontario, on the Detroit River, was chosen as the site. Material advantages of the first importance, a large quantity of the important raw materials, limestone and salt (natural resources of the Dominion hitherto unexploited), ample transportation facilities, all combine to favor the location. A tract of land of over 650 acres was obtained, and the plant built thereon is of a capacity to supply the entire Canadian requirements, so engineered and constructed as to permit of readily increased production as future demand may warrant.

There has been erected a main building, 170 x 190 ft., and 10 stories high; a boiler-house, 60 x 144 ft.; one of the largest lime kilns in the world (80 ft. from the ground to the top); a lime building, 60 x 100 ft.; a machine shop and store, 36 x 260 ft.; offices, warehouses and other designated buildings. In all about 4,000 tons of structural steel have been incorporated in these buildings, while approximately 1,000 men were employed in construction. Taken together, it is the most up-to-date and complete soda ash plant in the world.

The salt is obtained in the form of brine from wells three miles distant, and is pumped to the plant. The limestone is taken from the immense quarries on the property, a complete quarry equipment being provided. This will not only take out stone for the company's own requirements, but will also turn out a large amount of crushed stone for commercial purposes.

Production at the outset is expected to be approximately 120 tons a day. It is fairly well assured that Canadian requirements will be materially larger than before the war. In 1912, imports of soda ash amounted to 48,875,207 lbs., of which 30,317,496 lbs. came from the United Kingdom and 16,550,511 lbs. from the United States. Canadian imports have grown steadily since, and the proportion of the United States imports has also gained considerably in relation to the total. For the fiscal year ending March, 1916, imports into Canada amounted to 71,984,700 lbs., of which 60,796,741 lbs. were of United States origin. The value of the 1916 imports was $587,391.

Officers and Directors

The men who are behind this new undertaking are: President, E. N. Trump, of Syracuse, N. Y.; vice-presidents, Sir Edmund Walker, Toronto, and A. H. Green, Detroit. Wallace Campbell, Syracuse, is secretary-treasurer. The other directors are Robert Mond, Northwich, England; Judge N. L. Miller, Syracuse, N. Y., and Henry Glendinning, Northwich, England. The manager is G. S. Rutherford, who has been in charge of construction and will continue as manager of the plant. Mr. Rutherford is a Canadian, born in Montreal and graduated from McGill University.

Manufacture of Whiting From Marl

AN INDUSTRY which has gained considerable headway in this country and Canada since the war and the restriction of imports is the manufacture of "English whiting"—a very finely pulverized calcium carbonate used as a filler for paints, etc. Several limestone quarrymen are making this material in connection with the grinding of limestone for agricultural purposes, and for asphalt and rubber filler. It is, however, possible to make it direct from marl, without pulverizing. Dr. T. Poole Maynard, geological engineer, Atlanta, Ga., has recently been working out a marl whiting proposition.

The following is an account of some Canadian experience along the same lines:

Canadian Experiments

Some 25 or 30 years ago the late W. G. Allan of Marlbank, Hastings County, Ont., manufactured whiting by pumping marl from a lake, through screens, into settling tanks. After air drying in sheds, it was sometimes further dried by artificial means. The whiting is said to have been of good quality.

A sample of marl was collected from Dry Lake, near Marlbank, along a ditch dredged by the Canada Cement Co. A rough laboratory separation of 300 grams, without previous grinding, was made with a small hydraulic classifier, which gave the following products:

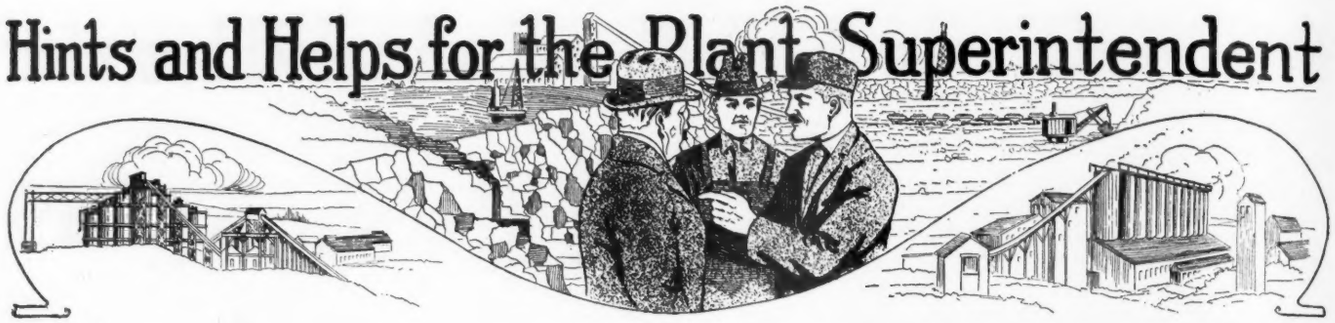
Fine Whiting	105.3 grms.	35.1%	Very light crm.
Coarse Whiting	131.7 grms.	43.9%	Very light crm.
Fine Middles	5.2 grms.	1.8%	Dark cream
Coarse Middles	18.1 grms.	6.0%	Dark cream
Tailings	27.3 grms.	9.1%	Grey
Loss	12.4 grms.	4.1%	

The first two products are of a fineness suitable for commercial use, while the middles would have to be subjected to grinding to prepare them for the market. Owing to impurities, such as sand and vegetable matter, the tailings could not be made use of for whiting, but should readily find a market in place of ground limestone for soil correction.

Great Marl Deposits in Ontario

There are a great many lakes throughout Ontario, in which there are large deposits of marl of suitable fineness for the production of whiting. While the majority of these marls dry to a light cream color, there are doubtless some from which an almost pure white product could be obtained. Since the beginning of the war, the market price of whiting, as quoted to paint manufacturers, has increased to about three times the pre-war price. As the apparatus necessary for the washing of whiting from marl need not be complicated, the capital required would not be great, and it is altogether likely a profitable industry could promptly be developed.

Hints and Helps for the Plant Superintendent



Steam Shovel Operation

A FACTOR in quarry and gravel-pit operation which oftentimes does not receive the study it should is the method of steam-shovel attack on the material to be taken out. At the LeRoy, N. Y., plant of the General Crushed Stone Co., A. L. Scott, general superintendent, has worked out a scheme in keeping with the characteristic thoroughness seen in every other detail of the plant and quarry operation, as described and illustrated in ROCK PRODUCTS, December 18, 1918.

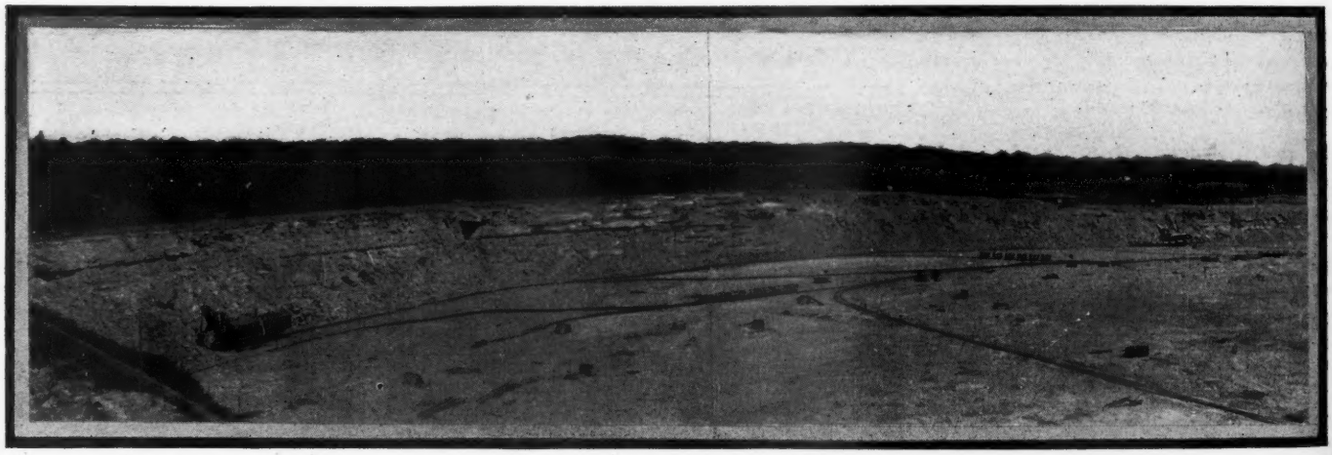
In operating the quarry two steam shovels, four narrow-gauge steam locomotives and side-dump, contractor-type cars are used. The shovels are operated a considerable distance apart in order to shoot large blocks, unsuitable to load and laid aside by the shovels in passing.

Upon the shovel digging out at the south end of the quarry (see sketch) the end of the permanent return track is laid up as close as possible to the shovel and the shovel is connected up with this track by its own track sections. The time required to return the shovel to the lower (north) end of the quarry is usually only about 30 minutes.

At the north end of the return track the shovel leaves the permanent track and travels again on its own sections to the bank. The whole time consumed between that when the shovel stops digging until it is again at work is about 1½ to 2 hours, according to the difficulties in connecting up at the ends.

The previous method of returning the shovel is shown in the second sketch. The new method is very satisfactory and represents a considerable saving in time, for it permits the shovel to return headed in the right direction, instead of making it necessary to back out and turn around at a switchback on the lower end. In the old method track had to be laid from the point X to the shovel.

Compare the time (2 hours) with the



LeRoy, N. Y., quarry of the General Crushed Stone Co.; note clean quarry floor

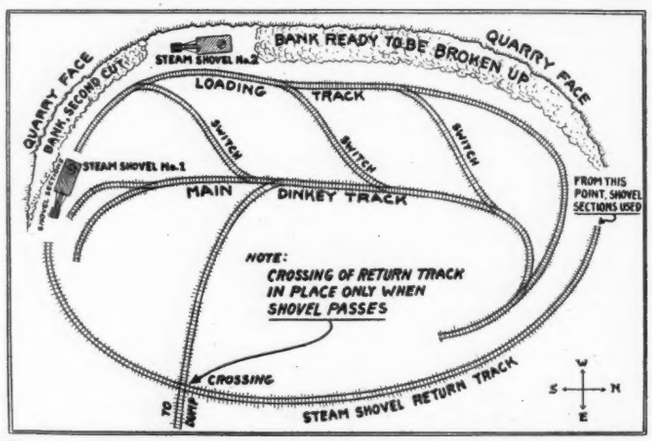


Fig. 1. Method of steam-shovel return employed at quarry of General Crushed Stone Co., LeRoy, N Y.

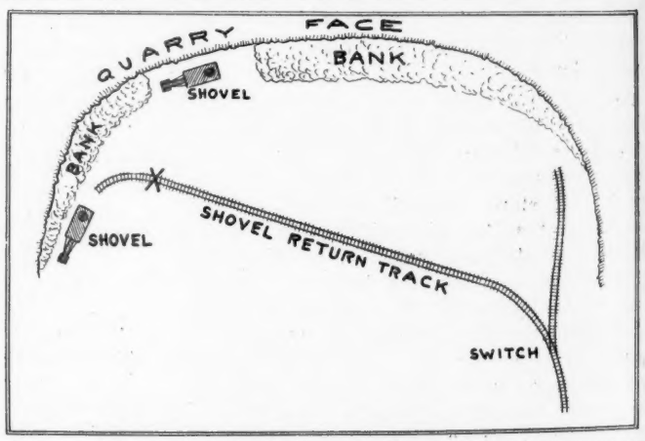


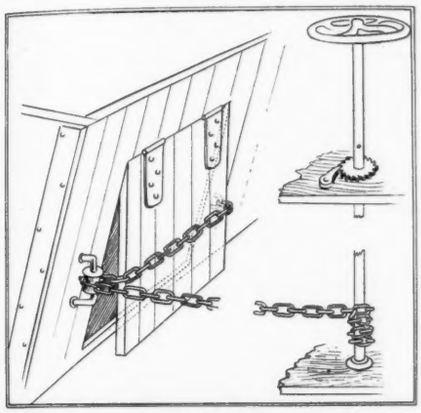
Fig. 2. Former method of steam-shovel return; temporary track laid from point X to the shovel

usual time consumed in this operation, often a whole day, and the economy of the track layout is apparent.

Other schemes of shovel operation in quarry and pit are solicited. Let's compare notes!

Bin Gate Control

THE SCHEME FOR CONTROLLING the flow of gravel into the primary crusher at the plant of the Wisconsin Sand & Gravel Co., referred to elsewhere in this issue, is illustrated herewith. A swinging door in the side of the hopper has a chain fastened across the lower half of the door as shown. To tighten or loosen this chain a windlass is provided like the handbrake on a railway car. The pressure of the material in the hopper of course opens it automatically.



Scheme for controlling flow of material to crusher

Greasing Wire Rope

IT HAS BEEN FOUND by tests of the Bureau of Standards that the item of lubrication is an important one in lengthening the life of a wire cable. It prevents rust. Rust increases the friction of the wires and prevents a proper distribution of the load through the rope. Moreover rust impairs the strength of the rope by reducing the cross-sectional area.

The accompanying illustration shows a scheme of wire-rope lubrication devised by George D. Smith of Bicknell, Ind., and described first in the "Yellow Strand," published by the Broderick & Bascom Rope Co., St. Louis, Mo.

Mr. Smith contends that his oiler gives 100% satisfaction, is easily adjusted and removed, operates in a simple but efficient manner and obviates handling of greasy waste. It is particularly adapted for use in mines, etc., where hoisting cables are subjected to considerable friction, wear and tear.

The device is a conical vessel provided with a slot to permit its being applied to and removed from cable. The oiler is filled with waste saturated with a good lubricant (such as Rope-a-lene) and is buckled around rope as shown in photograph. Cable is then set in motion and lubricant is forced into the rope by contact with packing at the small end. Note the rusty look of rope above the oiler and its appearance after passing through.

Method of greasing wire rope

Safety railing for gyratory crusher—Cement plant

Safety Railing for Crusher

BIG GYRATORY CRUSHERS with a working platform level with the crusher opening, as one often sees in crushed-stone plants, are a frequent source of accidents. Not a few workmen have been killed by getting caught in the crusher, while minor injuries are common.

A substantial steel railing, like that shown in the accompanying view, is an easily made safeguard. It not only provides something to catch hold of, while working at the crusher, but it is here, and always should be, used as an anchor for the workman's life belt, so that there is no possibility of his slipping into the crusher opening.

The view shown was taken at a cement plant which has adopted safety-first precautions. For its use ROCK PRODUCTS is indebted to the Manager of the Accident Prevention Bureau of the Portland Cement Association.

Question Box

GOT a problem you want help on? Send it in. We will agree to find some operating man who can answer it.

Lime the Most Economical With Prices Prevailing in 1918 in Pennsylvania

Report of the Bureau of Chemistry of the Pennsylvania Department of Agriculture Shows Price of Limestone Relative to Lime Is Too High

By James W. Kellogg*
Chief Chemist, Bureau of Chemistry Department of Agriculture, Harrisburg, Penn.

WHILE THE ANALYSES and selling prices of a small number of samples cannot be claimed to be entirely or completely representative of certain brands of lime products, such information is of value in proportion to the brands and samples examined, in assisting prospective purchasers and others interested to a knowledge of the character of these products as shown by the samples received and analyzed during the year. The following table gives the number of samples and the average analyses and retail selling prices of the several classes of lime products analyzed.

These average prices are in excess of those reported for the brands received during 1917, while the average analyses show no marked changes in comparing the two year's products except in the case of lime where the total average contents of calcium and magnesium oxides is several per cent. higher than the average for this same material for last year. The average price for the brands of pulverized limestones is 60 per cent. higher than the average for the brands received in 1917 and the approximate increases for the remaining classes were for artificial carbonate of lime 19 per cent., marl 38 per cent., lime 24 per cent., hydrated lime 25 per cent., and gypsum 44 per cent. Based on the average analyses and considering the total average contents of calcium and magnesium oxides, the average prices shown would indicate that the number of pounds of total elements necessary in correcting soil acidity supplied for $1 in the several classes would be as follows: Pulverized limestone 137.0 lbs., artificial carbonate of lime 117.4 lbs., marl 103.6 lbs., lime 202.1 lbs., and hydrated lime 123.5 lbs.

In the case of gypsum a comparison of the amount of calcium oxide supplied and the selling prices with the other classes of materials, would be out of proportion owing to its lower content of calcium oxide and to the fact that the function of gypsum or land plaster is different from the carbonates of lime, hydrated lime and burnt lime, as it is not adapted to correcting soil acidity but is of value in fixing and holding ammonia and aiding in rendering other forms of plant food more available.

From the number of pounds of elements supplied in the several groups for $1, it will be noted that the greatest number of pounds can be purchased in the case of lime. While these figures will show the amount of elements supplied by each class as shown by averages, the fact should not be lost sight of that much depends on the kind of agricultural lime desired or needed, as in certain cases one grade or kind would be more desirable and would be used to better advantage than another. Insofar as the neutralization of soil acidity is concerned, however, the calcium and magnesium oxides present are the elements to be considered in performing this work.

Discussion of Results of Inspection

As already shown, there are three grades of lime products in which the calcium as well as the magnesium contained therein is combined with calcium dioxide forming carbonates of lime, namely, raw ground rock or pulverized limestone, precipitated or artificial carbonate of lime and marl. The artificial carbonate of lime is a chemical preparation resulting from manufacturing processes, while marl is obtained as a natural deposit of clay containing calcium and magnesium largely in the form of carbonates. Of the 29 samples of pulverized limestone analyzed, representing 11 different brands, nearly one-half of this number were found to contain approximately 1 per cent. less calcium oxide than guaranteed.

Nearly all were guaranteed for calcium oixde and several were guaranteed for calcium in the carbonate form. In many cases where the content of calcium oxide was found to be low, the magnesium oxide exceeded the amounts claimed, thus, in a measure, overcoming the calcium deficiencies.

The composition of these products was variable as would be expected in materials of this kind. The calcium oxide content varied from 28.59 per cent. in a sample of dolomite origin containing 19.52 per cent. magnesium oxide, to 55.29 per cent. calcium oxide in a low magnesium rock which contained 0.76 per cent. magnesium oxide, the average being 46.31 per cent. The percentages of magnesium oxide found were from 0.54 per cent. to 22.13 per cent. in a brand containing 28.84 per cent. calcium oxide averaging 4.32 per cent. There were 4 samples of limestone of dolomite origin running low in calcium oxide and high in magnesium oxide, the analyses of which were as follows: 19.18 per cent. magnesium oxide with 29.16 per cent. calcium oxide and 22.13 per cent. magnesium oxide with 28.84 per cent. calcium oxide. The magnesium oxide varied from 0.54 per cent. to 22.13 per cent., averaging 4.32 per cent. The oxide percentages calculated to the carbonate forms averaged 82.60 per cent. calcium carbonate and 9.05 per cent. magnesium carbonate.

The determinations for acid insoluble matter gave figures of from 0.49 per cent. to 13.30 per cent. averaging 7.54

Classes of Lime Products.	Number of samples.	Moisture.	Calcium oxide.	Magnesium Oxide.	Sulphur tri-oxide.	Insoluble matter.	Price per ton.
		%	%	%	%	%	
Pulverized Limestone,	29	0.09	46.31	4.32	-------	7.54	$7 39
Artificial Carbonate of Lime,	13	2.60	50.31	2.58	-------	1.47	9 01
Marl,	3	3.07	48.35	0.86	-------	5.79	9 50
Lime,	6	-------	66.08	9.00	-------	4.52	7 43
Hydrated Lime,	81	-------	58.39	12.39	-------	2.61	11 48
Gypsum,	3	9.77	32.86	-------	41.90	2.28	17 33

*Reprint of part of "Lime Report" for year 1918.

per cent. As a result of the determinations of the degree of fineness, all the samples were found to be fine enough so that the coarsest particles would pass a No. 10 mesh sieve, the majority passing through a No. 20, several being fine enough to pass a No. 30 and a No. 40 mesh sieve. The average degree of fineness indicated that 86.4 per cent. of the pulverized limestones would pass a No. 50 and 76.2 per cent. would pass a No. 100 mesh sieve, thus indicating that this class of products was in a good state of pulverization.

The 13 samples, including 3 brands, classified as artificial carbonate of lime showed that they did not differ materially from the composition of the pulverized limestones except that they contained less acid insoluble matter, averaging 1.47 per cent. Seven of these samples were found to contain less calcium oxide than claimed, however, in all but two of these cases, the magnesium oxide exceeded the guarantees thus largely offsetting the calcium deficiencies. The contents of calcium and magnesium oxides varied from 46.99 per cent. and 0.49 per cent. to 52.63 per cent. and 6.60 per cent., averaging 50.31 per cent. and 2.58 per cent. respectively. The averages in terms of carbonates were 89.56 per cent. calcium carbonate and 5.40 per cent. magnesium carbonate. The tests for the degree of fineness showed that upon an average, the coarsest particles would pass a No. 10 mesh sieve and the average respective percentages which would pass a No. 10, No. 50 and No. 100 mesh sieve were 98.9 per cent., 75.1 per cent. and 65.4 per cent.

The analyses of the three samples of marl representing one brand showed very little variation in their composition, all exceeding their guarantees, the average composition being as follows: calcium oxide 48.35 per cent. equivalent to calcium carbonate 86.25 per cent; magnesium oxide 0.86 per cent. equivalent to magnesium carbonate 1.79 per cent. The insoluble matter averaged 5.19 per cent. The detailed results of analysis of these three classes of products will be found in Table I.

There were only six samples analyzed representing as many brands of lime, commonly known as burned lime, resulting from the burning or calcining of raw rock used. Three of these were found to contain less calcium oxide than guaranteed, two of this number exceeding the guarantees for magnesium oxide. The calcium oxide showed variations of from 51.71 per cent. to 89.82 per cent., averaging 66.08 per cent. and the magnesium oxide found was from 1.23 per cent. to 37.33 per cent., averaging 9.00 per cent. This high content of magnesium oxide was present in a sample of dolomite origin analyzing 54.00 per cent. calcium oxide.

In this class of materials, determinations were made for carbon dioxide, which represents the amount of unburned limestone or "core" remaining in the sample, which is an index of the thoroughness with which the burning process has been performed. The amounts noted in these few samples were from 0.35 per cent. to 13.22 per cent., averaging 6.59 per cent. As each percentage of carbon dioxide indicates that 2.2757 per cent. is approximately the amount of "core," the average carbon dioxide found would show that approximately 15 per cent. of unburned limestone was not affected by the process of burning. These figures, however, because of the small number of samples included, cannot be claimed to fairly represent the product. The amounts of insoluble matter ranged from 1.03 per cent. to 8.78 per cent., averaging 4.52 per cent.

The largest number of samples received were those of hydrated lime prepared by the addition of water to lime in the process known as "slaking" and the calcium and magnesium present in the same is, therefore, largely in the form of calcium and magnesium hydrates. There were 81 samples representing 21 brands analyzed which contained from 43.80 per cent. to 73.69 per cent., averaging 58.39 per cent. calcium oxide and from 0.83 per cent. to 32.79 per cent., averaging 12.39 per cent. magnesium oxide. All of these samples were guaranteed and nearly half of them failed to meet the guarantees given for calcium oxide. In 10 cases where the calcium oxide was found to be deficient, the magnesium oxide exceeded the claims made. There were 19 samples containing a high content of magnesia being, therefore, largely derived from dolomite rock, containing from 9.60 per cent. to 32.79 per cent. magnesium oxide. Those brands carrying the lower amounts of magnesium oxide ranged from 0.83 per cent. to 7.98 per cent. The insoluble matter in hydrated limes, as a rule, is low and in the samples analyzed averaged 2.61 per cent., ranging from 0.02 per cent. to 10.40 per cent. and 15.84 per cent., the two highest in insoluble matter noted. Estimating the calcium and magnesium oxides in the hydrate form from the average analysis would show that this class of products would contain approximately 77.13 per cent. calcium hydrate and 17.93 per cent. magnesium hydrate.

The lime product gypsum, commonly known as land plaster, was represented by only three samples of one brand, the composition of which is fairly constant. The average of the results secured was 32.86 per cent. calcium oxide, 41.99 per cent. sulphur trioxide which being estimated as gypsum or calcium sulphate averaged 71.42 per cent. The insoluble matter was low averaging 2.28 per cent.

The three samples classified as miscellaneous included one brand of "agricultural lime" analyzing 58.78 per cent. calcium oxide, 0.72 per cent. magnesium oxide, selling for $6 a ton, and two samples of "Berkley Hydra-calcite" which averaged 59.41 per cent. calcium oxide, 1.80 per cent. magnesium oxide and had an average selling price of $7.83 a ton.

Great Variation in Prices

There seems to be, from the information secured at the time of selecting samples, no uniformity in the retail selling prices for the various grades of lime products sold in the state. In the case of pulverized limestone, the retail prices ranged from $4 to $14 in samples analyzing approximately 50 per cent. of total calcium and magnesium oxides, averaging $7.39 a ton. The brands of artificial carbonate of lime were offered for from $2.60 to $12, analyzing 48.85 per cent. and 53.83 per cent. total calcium and magnesium oxides respectively, and averaged $9.01 a ton. The prices received for the three samples of marl showed but little variation, the average being $9.50 a ton, analyzing 49.21 per cent. of calcium and magnesium oxides. The retail prices for the six samples of burned lime were from $5.25 in a sample containing 63.89 per cent. to $11 in one containing 69.56 per cent. of total calcium and magnesium oxides respectively, the average being $7.43 a ton.

A marked variation in the retail selling prices for hydrated lime was also noted ranging from $8 to $15, averaging $11.46 a ton. The brand having the lowest selling price contained 67.61 per cent. total oxides, being 5.53 per cent. in excess of the brand having the highest selling price. A higher selling price was noted in this class of products, which was excluded from the average and not considered as being representative, as it was estimated from the price for one sack.

The prices for the three samples of gypsum averaged $17.33 a ton. It is evident from these figures, therefore, that purchasers should consider carefully the guarantees for the various grades of lime products and the prices charged before deciding as to what brands should be purchased. It will be noted by referring to the tables showing the analyses and retail selling prices that in many cases those brands selling for the lower values contained greater amounts of calcium and magnesium oxides, the elements necessary and of value in soil amendment, than those which sold for the higher retail prices.

British View of the Cement, Lime and Limestone Industries

American Development an Object Lesson—Cement Production as a Measure of Industrial Expansion—Raw Materials in Plenty

By W. Alden Brown
Author of "The Portland Cement Industry," Kenilworth, Warwickshire, England

LIMESTONE IS THE RAW MATERIAL on which is based the manufacture of lime, and it is also the most important ingredient, in one form or another, in a Portland cement mixture.

Lime and Portland cement have been used extensively in the war, in far greater quantities than is generally appreciated; following the war the demand for these commodities cannot be estimated, considering the vast and unlimited possibilities of their uses.

Ordinary people are waking up to the manifold uses and advantages of limestone products, and are anxious for greater knowledge. When they are fully awake to their importance and application, the manufacturers will have to throw off their lethargy and get busy, for many manufacturers are over-conservative and indifferent to progress with obsolete or insufficient machinery, whilst others have not taken business efficiency seriously. But the future will call for men of serious purpose, well developed faculties, enterprise and mental cultivation, who have specialized in this industry—there will be no room in the front ranks for men who can do many things indifferently well. The war has been a great teacher, and the nation will have gained much if the lessons learned are put into practice.

American Example

There are also many object lessons from the American nation; in all their industries they have associations for promoting and encouraging technical research, statistical and publicity committees giving all concerned the best of their knowledge and experience, and men with ideas are encouraged and assisted. Is it to be wondered at that their industrial progress has been so rapid?

Hitherto half the energies of the British business men were devoted to the effort to keep others back.

But the nations must change and be more frank and open with one another; petty jealousies must cease; there must be a greater bond of organized cooperation with our fellow merchants and manufacturers, each giving the best of their knowledge and experience for the benefit of all, for there must be no misapprehension, the enemy will issue from the war embarrassed—and possibly bankrupt—but he will still exhibit those qualities which have made the German nation one of the greatest wealth-producing and trading communities in the world.

It may be assumed that this is the last war with physical weapons in which the enemy will engage for many a long year, but the highly-educated and commercial population are preparing, if not already prepared, for economic war with a carefully devised organization, and as soon as the armies pile their arms and the navies resume their peaceful duties, the old competition of the factory will be resumed with an intensity unknown before, and it behooves this country to look ahead and be prepared with methods of economical production, by concentration of activities, energy wisely directed, and time strictly economized, if the British are to compete favorably with our rivals for the markets of the world.

It has frequently happened that inventions made in this country have been more rapidly developed abroad than at home. It was so with Portland cement manufacture. The benefit of early experience is outweighed by having to defray the cost of experiments of which later comers in the field reap the results without a similar expenditure.

Slow in Adopting Improved Methods

The German technologists were quick to see the value of this building material and to substitute scientific methods, the objects of which were to improve the final product, to reduce cost of production, and to increase output. These methods were adopted in other countries, long before we at home realized that, in order to keep pace with our competitors, it was necessary to adopt these methods ourselves.

It was but a few years ago that most of the cement-making machinery came from Germany, but happily this unsatisfactory state of things no longer exists. British firms can now compete with anything of the kind manufactured in Germany.

A great deal of this pioneer work was carried out in this country and abroad with great success against much German influence and opposition, by Messrs. Ernest Newell & Co., Misterton, who are to be congratulated for their tenacity in such an up-hill fight.

World's Cement Industry

Remarkable as has been the rate of growth of pig iron production, that rate of increase has been more than surpassed by cement manufacture, and in pre-war days it is interesting to observe that despite panics and periods of business depression, cement production has never failed to show an annual gain in the world's output.

In 1913 the world's estimated output of Portland Cement was approximately 31,000,000 tons (representing a capital outlay of at least $300,000,000). The three largest producing countries were:

U. S. A.	15,500,000 tons
Germany	5,000,000 tons
Great Britain	3,000,000 tons

Thus it is apparent that the Porltand cement industry holds a conspicuous and important position in the world's industries and its soundness and stability are now of vast interest to the nation commercially and financially. The immense production today has been made possible by the radical changes in the machinery and equipment used in its manufacture.

If we take the exports of Germany and Austria alone in round numbers, they amount in value to some $10,000,000, whereas the value of our own exports were only just over $6,250,000 in 1912. This is a state of things which should not exist.

Now is Great Britain's opportunity for making ample provision for meeting the enormous demand for lime and Portland cement, and success can be achieved only if, today, the work of preparation is begun.

With the greatest building era ever

The Author

MR. BROWN is one of the foremost British experts on the manufacture of Portland cement and lime. He is well known to a large circle of American manufacturers and engineers because of his former association with the Cowell Portland Cement Co., Cowell, Cal.

known coming on apace, are we preparing our plans to meet the enormous demand that will be made for lime and Portland cement? The writer fears not. Existing facilities are quite inadequate to meet the situation created in this country, hence high prices must prevail, and the public already overburdened with high cost of food and clothing, rates and taxes, will be asked to pay more rent for their homes, for we cannot neglect our markets abroad or we shall run the risk of losing them.

The growth of the Portland cement industry and its relative importance in this country at the present time is rarely understood. It can no longer be considered a small and unimportant industry and its condition purely a matter of private or local interest.

The success in the larger spheres of industrial progress is a matter of state as well as individual concern, and the writer would venture to suggest that searching investigations be at once undertaken on the lime and Portland cement industries with a view of establishing without loss of time four Portland cement factories each with a weekly capacity of 3,000 tons, giving a total annual output of approximately 600,000 tons. Two should deal with soft raw materials, namely, chalk or marl, and the other two with hard (crystalline) materials, namely, agrillaceous limestone, pur limestone, or blast-furnace slag, and a like number of lime plants as an appendage equipped with hydrating machinery, the capacity to be determined by investigation.

This would tend to set the pace and demonstrate the possibilities of the industry in this country.

The state annually uses large quantities of Portland cement and lime, therefore it would not only be a source of profit, but by introducing the most economical methods of production, would lead the way and stimulate private enterprise.

No ships are needed to bring the raw materials for the manufacture of these valuable commodities, the requisite materials, limestone, clay and coal are in abundance in this country and only waiting to be developed.

There is no mystery attached to the manufacture of either lime, hydrated lime or Portland cement, but there is ample scope in this country for the adoption of new methods and more modern machinery, and a special need exists for state assistance (not necessarily financial) for the promotion and organization of scientific research with a view to increased economy and efficiency in the processes of manufacture, if we are to retain and improve our present position in the industry.

Wonderful Prospects for World's Cement Industry

Nothing can stop the progress of the cement industry throughout the world; every year sees more and more of this wonderful building material used. All one has to do is to look back over the great growth of the industry during the past decade in order to measure its importance in the business world today.

The prospects at the present time were never brighter for these industries, and no matter whether the British cement companies get together or not, they will have to compete with foreign competition to supply the demand which must grow with ever increasing activity, which will of necessity cause the price of cement to be reduced.

The present cost of manufacturing lime and cement since 1914 has increased due to higher wages, coal for power and burning, repair and renewal material; therefore the situation must lead to the adoption of as much up-to-date machinery and labor-saving appliances as possible, i. e.: the churn drill, the steam shovel, well-equipped crushing plants, the continuous lime kiln, the mechanical hydrator, the rotary kiln, the locomotive crane, the conveyor belt, automatic loaders, motor trucks, and many more yet to be invented, which have to be depended upon for those things that were done by laborers hitherto.

We shall resume in the future our good commercial relations with the United States on the American continent and compete against their traders and manufacturers, wherever we can, and with renewed vigor in the neutral markets, but if, as Sir G. P. Hunter says, "It is not only possible but probable that America will become the shipbuilding and ship-owning center of the world," as far as Portland cement is concerned, if we cannot produce it at a much lower figure than we are doing today or even in pre-war days, our chance for competing in the American continent or elsewhere is not very hopeful, unless, as the writer has pointed out, we are prepared to adopt methods of economical production, for we must never forget that although the times of bitter commercial competition between industrial countries might not come at once, they will come again, and the only firm rock on which to build is the low cost of production.

French Rock Products Producer Outlines Situation

Says Capital and Equipment Are the Things Most Needed

A GOOD DEAL has been published about reconstruction in France and the opportunities there for American building materials. Where this refers to lumber and steel the opportunities are probably large ones, but with the more common materials like cement, lime, stone, gravel and sand there is every reason to believe that Frenchmen are amply able to care for their own needs and that the real opportunity of American business men is along the lines described in the following letter:

"We need in the first place:

"1. A machine for making bricks of cement. Now, there is a very good one in our factory, which makes four bricks at a time, and more than three cars, or 30,000 kilos per day, and it is quite sufficient, but this machine is not ours. It cost 60,000 francs delivered, set up, and in order not to transport it elsewhere, the proprietors would turn it over to us for 50,000 francs or even less.

"2. Then a machine for making the cement pipes; it costs 5,000 francs only.

"3. Then the gravel land which we have been exploiting for 25 years, having no longer a supply for more than five years, it is necessary to acquire the gravel land contiguous to our property which costs 45,000 francs.

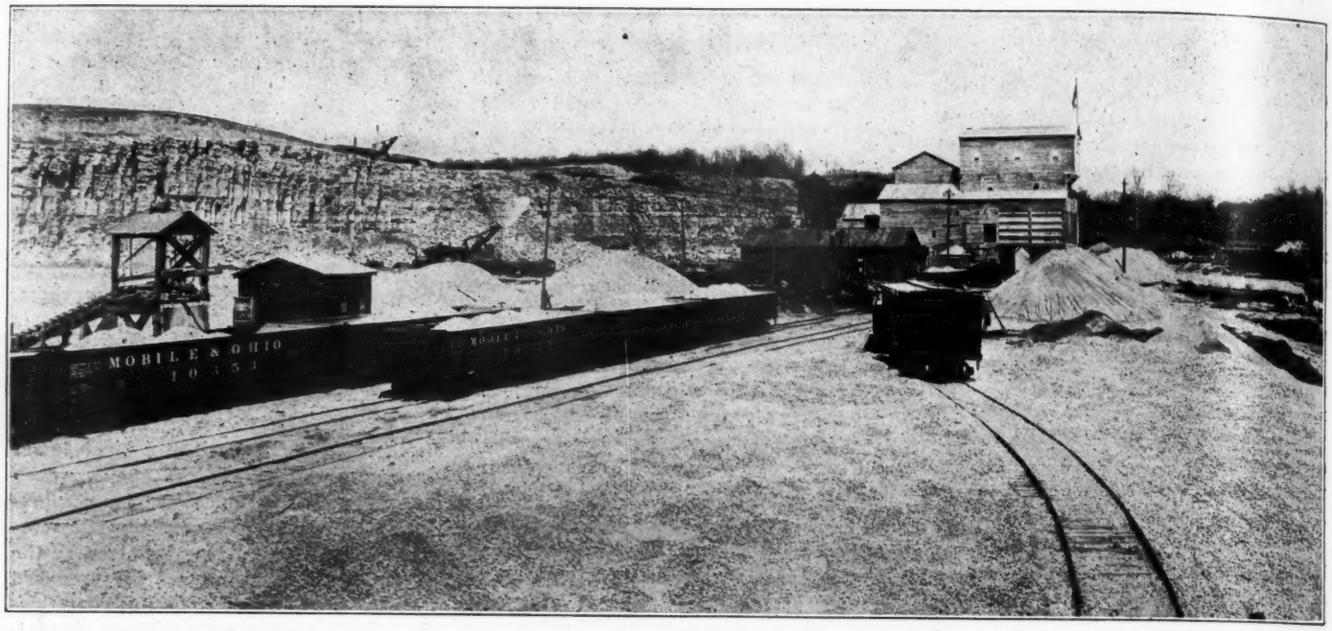
"For more than fifty months that the war has lasted and the works of construction have been entirely arrested in our country, we have had to cut into our available capital; we know perfectly well where we stand, and we know what we need. In proof of this, we have even given advice to Americans who possess gravel lands in Knoxville, and that was over fifteen years ago; others who have worked with us have afterward left for Havana, Cuba, to manufacture pipes there.

"In a word, a round sum of $20,000 is necessary for us in order to be able to ascend the current and carry out successfully our enterprise; this is the only thing that we lack.

"As we love very much the Americans who have just delivered us from the Barbarians and the Germanic octopus, and who have just proved to the world their love of Liberty and Civilization, we take the liberty to confess frankly what we need, and to ask you whether you can be of service to us.

H. Rod & Cie."

Renens, France,
Nov. 8, 1918.



Quarry Plant With an Enviable Record of Accident Prevention

Columbia Quarry Co., St. Louis, Mo., Profits by Officers' Experience in Safety-First Work in Coal-Mining Operations

SEVERAL YEARS' EXPERIENCE in accident prevention work in coal-mine and coal-breaker operations, to which both the State and National Governments have given much attention, has been put to good use by the officers of the Columbia Quarry Co. in the operation of its three quarries in southern Illinois.

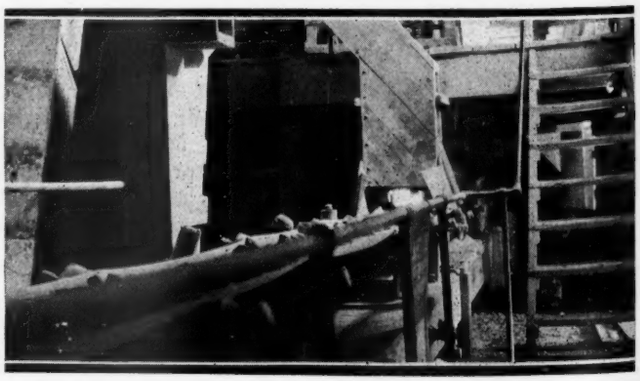
During the last three years this quarry company has featured "safety-first" and has added safeguards of various kinds, as illustrated in the accompanying pages, in order to do its share in accident prevention. The result has been that with three quarries employing 159 men in the year 1918 (and as every quarry operator knows labor that year was not the picked kind), there were but two accidents where the time lost was more than 14 days and only 10 accidents where the time lost was from 1 to 14 days. There have been no fatalities since the safety-first campaign was begun.

C. E. Klaus, Superintendent, and C. P. Tigges, Secretary and Sales Manager

Some Safety-First Appliances

The safe-guards provided in the crushing and screening plant are such as any crushed-stone or gravel plant operator can provide with a little observation of the places where danger lurks and with the expenditure of a few hundred dollars for lumber and the plant carpenter's or mechanic's spare time. All vertical or approximately verticle driving belts are completely enclosed to a point 6 feet above the floor. Motors, screen drives, driving pulleys, etc., are protected by wood lattice guards such as illustrated herewith. All platforms, stairways, horizontal conveyors, and other hazardous places are protected by pipe railings. Explosives are stored in a brick building several hundred feet from the plant. This building is provided with ducts for ventilation and with facilities for heating in freezing weather. Liberal use has been made of safety-first signs and considerable educational work has been done among the plant employes.

Other and newer plants have been provided with more up-to-date safety devices of various kinds, as for example the plant



Simple pipe railings like this guard all conveyor stairways, and other hazardous places

of the Birmingham Slag Co. described in ROCK PRODUCTS of April 26, but the plant described herewith is an interesting example of what may be done at any existing crushing plant where the safety-first movement is taken hold of in earnest, and with little or no expenditure other than what might be legitimately charged to plant maintenance.

Doubtless the wooden guards provided here for the various machines could be improved upon by a professional safety engineer, but the ones shown have accomplished their purpose, which after all may be as much in the effect on the morale of the employees as in the actual efficiency of the protective screens. For the various guards, signs, etc., about the plant convince the employes that their employer is that much interested in their welfare, and the result has been a justifiable pride in making and preserving a "no accident" record.

Quarry Operation

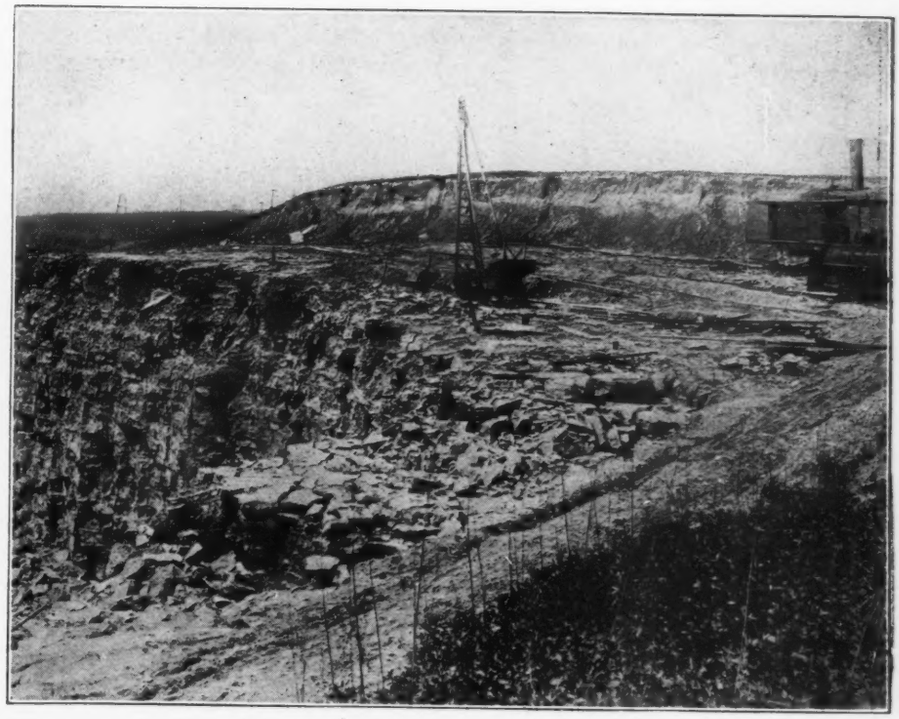
The principal plant (and quarry) of the Columbia Quarry Co. is situated at Krause, Ill., about 14 miles east of St. Louis, Mo., and is served by the Mobile & Ohio Ry. The quarry operation is shown in the various views accompanying this article. The rock is hard limestone and runs about 90 per cent calcium carbonate.

The rock is overlaid with about 16 ft. of sandy clay, which is stripped off with a 30-ton revolving shovel and removed to the dump in 4-yd. side-dump cars and a narrow-gauge dinky. About 600 cu. yds. of stripping per day is removed.

The quarry face is about 1500 ft. in length with a height of from 80 to 85 ft. The present method of working this face is in a single bench with deep well-drill blast holing and heavy blasting. But, as described in ROCK PRODUCTS, April 12, page 25, the bottom 20 ft. of this ledge is free from seams or stratifications and this method of working is not entirely satisfactory. During the present season the operation will probably be changed to working this lower stratum of solid stone separately by means of tripod drills.

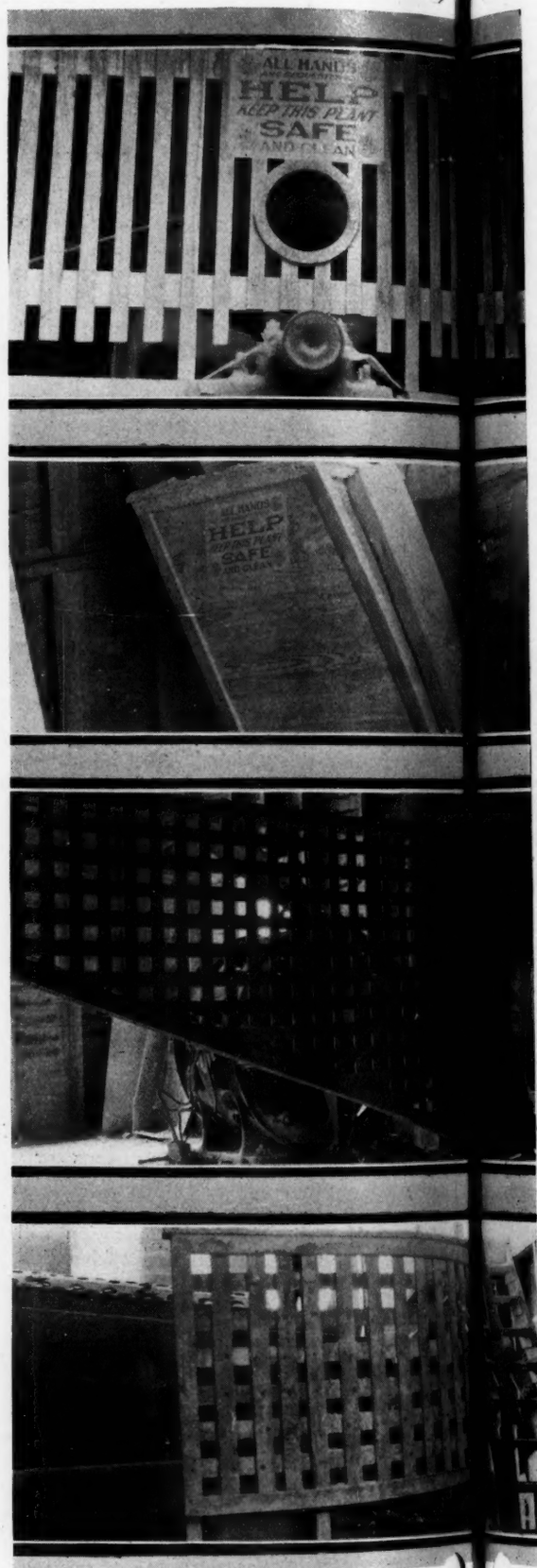
At present, drilling is done with two well drills, electric-motor driven. These drill holes are practically the whole depth of the face and are spaced 8 to 10 ft. apart and 25 ft. back from the face of the quarry. From 80,000 to 100,000 tons are ordinarily removed in one blast, using 40 per cent nitro-glycerine dynamite. With the present method of quarrying a great deal of drilling with compressed-air hand drills and secondary blasting is required.

Two steam shovels, one 100-ton with a 3½-yd. bucket and one 70-ton with a 2½-yd. bucket, are used for loading in

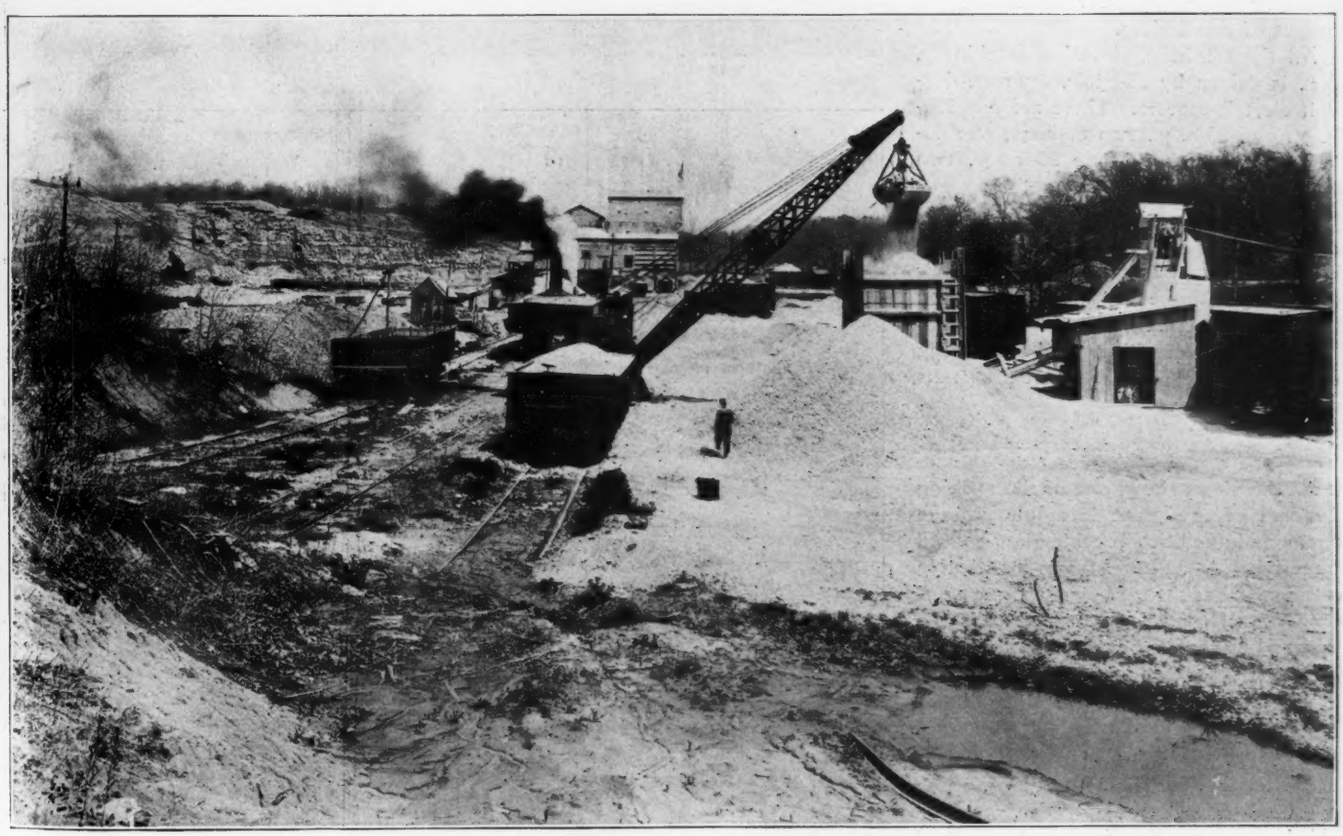


Quarry views—stripping, shovel loading, hand loading

Quarry face above the point where the solid 20-ft. thick ledge begins, showing ease with which the upper 60-ft. is broken up by deep drilling and heavy blasts—Below this point it is proposed to operate the quarry with another bench



Safety devices provided in crushing plant: (1) Belt and pulley guard of large crusher; (2) Belt guards; (3) Motor and belt guard; (4) Protection for cylindrical screen drives



Above, crushing plant from quarry; below, agricultural limestone plant

the quarry. The combined capacity of these two shovels averages 2500 cu. yds. of material per 10-hour day.

The shovels load 5-yd. side-dump narrow-gauge cars, which are hauled in trains of from 6 to 10 cars by a 16-ton dinky to the foot of the crushing plant incline.

Crushing and Screening Plant

Two cable inclines are provided for operating the quarry in two benches. A dumping track is also provided over one of the crushers ordinarily used only for recrushing, so that it can be used as a primary crusher when desired.

The initial or primary crusher is a No. 12 gyratory. The output of this crusher is elevated to a 5 x 20-ft. scalping screen where everything under 2¾ in. is screened out. The rejections go by gravity to a No. 8 gyratory, where they are recrushed. This crusher may also be used as a primary crusher, as already referred to.

The screenings from the scalping screen and output of the No. 8 crusher go to two 4 x 24-ft. sizing screens where these sizes are made: 2-in; 1½-in.; 1-in.; ½-in.; and dust or screenings. Any stone over 2-in. from these screens is carried by a belt conveyor to bins directly over two No. 5 gyratories, where the material may be more finely reduced is desired. The output of the No. 5's is returned to two 4 x 24-ft. sizing screens. A No. 3 gyratory is provided for increasing the output of small sizes.

All the crushing, elevating machinery, etc., is driven by 25-cycle, 3-phase, 440-volt electric motors. There are one 150-h. p., one 75-h. p., two 60-h. p., one 40-h. p., three 30-h. p., one 20-h p., two 10-h. p., and two 5-h. p. motors.

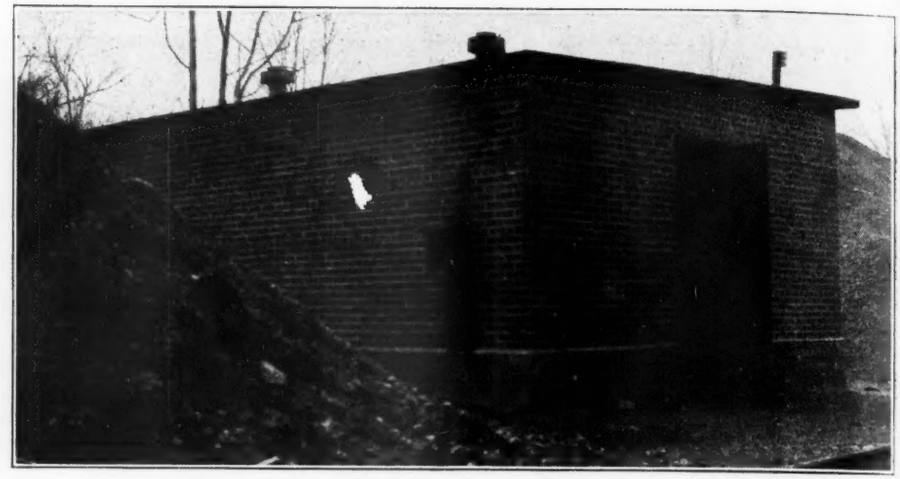
In addition to the screening facilities already mentioned there are two vibrating screens made by the company in their own shop. These are used to rescreen the ½-in. material.

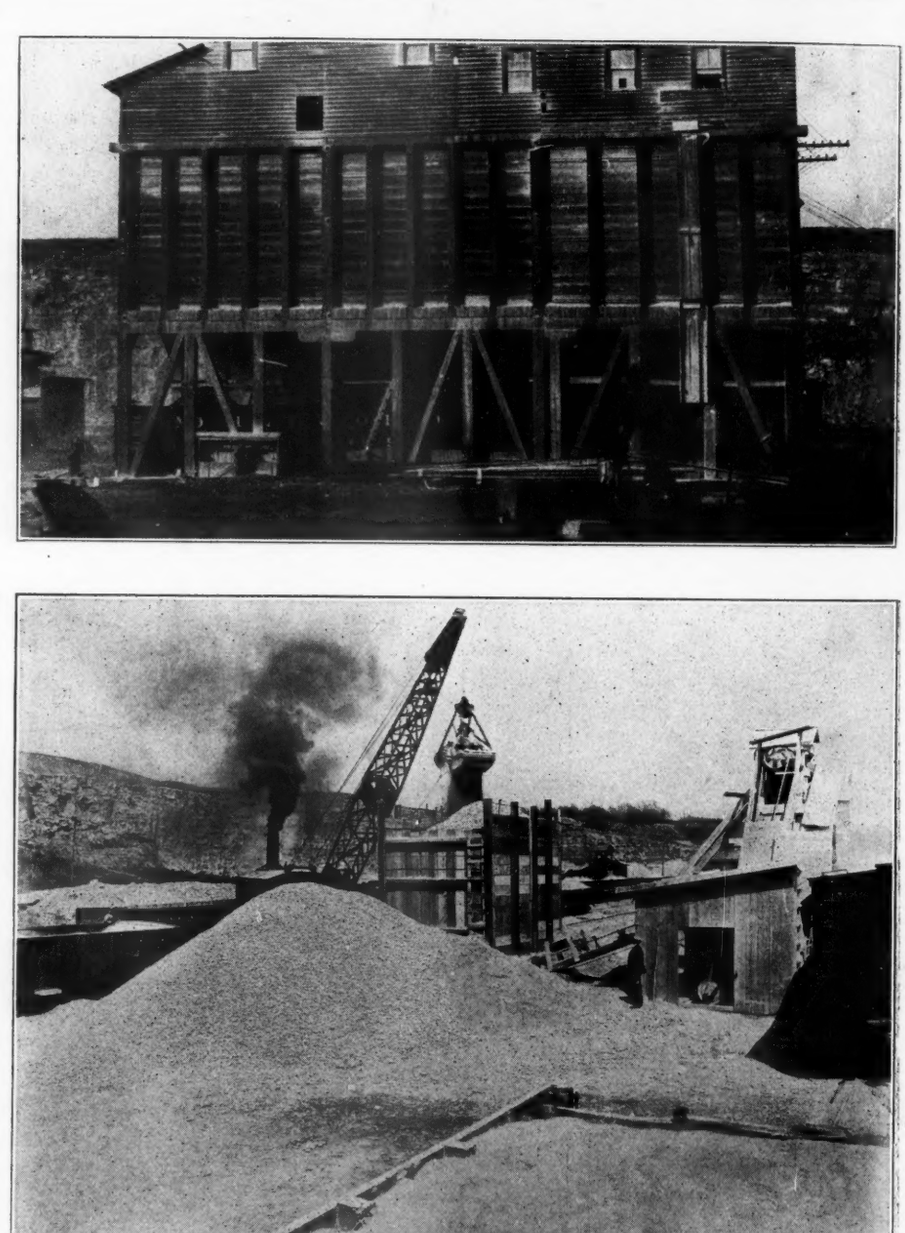
The total crushing and screening capacity of the plant is about 2500 tons per 10-hour day.

Ample Storage Facilities

As the views show, one of the striking features of the plant is ample storage room and facilities for handling stored material. A 30-ton steam locomotive crane switches the cars on the stone company's tracks and unloads and loads the material as required at an additional cost of 8 cents per ton over and above the cost of the material shipped from the plant direct. Bin storage to about 500 tons is provided.

For loading out rip rap and large stone a cable-car, incline and tipple are provided as seen in the view at the head of the article, on the extreme left.





Top, brick dynamite storage house; center, bins and track scales; below, agricultural limestone plant

Agricultural Limestone Plant

Originally all the agricultural limestone used in this part of Illinois was screenings, but two years ago in order to increase the output of fines as well as to produce a finer material the company added two hammer mills and this year has installed a third one.

The pulverizing plant was constructed in the storage yard instead of in the crushing plant so as to make use more easily of the stored stone. The feed for the pulverizers is taken out of the storage piles and loaded into a hopper bin with the locomotive crane. From this bin the material is fed to the pulverizers by a belt conveyor. The output of the pulverizers is elevated by a vertical bucket-elevator and is loaded into box cars in bulk through a gravity chute.

Track Scales a Feature

An essential operating feature of the plant are two 75-ft. track scales extending the full length of the loading bins and directly under them. Thus a car is weighed as it is loaded. The stone company is a member of Southern Weighing and Inspection Bureau, so that the car weights recorded at the plant are accepted by all the railways. As in other plants where track scales are constructed under the bins, the operators are enthusiastic in their statements concerning the economy of such an arrangeemnt.

The general superintendent in charge of the plant is C. E. Klaus; the secretary and sales manager is C. P. Tigges; the vice-president and treasurer, E. J. Krause and the president, C. H. Krause. The offices of the Columbia Quarry Co. are in the Fullerton Bldg., St. Louis, Mo.

Agricultural Lime and Limestone Conference at Knoxville

Leading Southern Agricultural Authorities Discuss Problems with Producers

USE OF LIME in soil improvement and the possibilities for greatly increasing the yield of southern crops by a systematic program advocating the use of lime, was the topic of a conference of southern university experts and representatives from manufacturing plants held at the Atkin hotel, Knoxville, Tenn., April 29 and 30. A part of one afternoon was devoted to a visit to the plant of the American Limestone Co., at Mascot.

Dr. H. A. Morgan, dean of the department of agriculture, University of Tennessee, presided at the sessions, and Prof. W. H. McIntire acted as secretary. The subject of lime and soil improvement has been investigated carefully at the University of Tennessee experiment station. Dr. Morgan has personally given a great deal of thought to the matter, and only recently Prof. C. A. Mooers, of the University of Tennessee department of agriculture, issued a bulletin on the subject.

Prof. E. O. Fippin, of Cornell University, an expert on soils, spoke Tuesday afternoon on the value of lime in increased production. Prof. Fippin has made a careful study of the question and in his talk he gave several interesting phases of practical experiments in the use of lime. (Prof. Fippin was recently apointed agronomist of the Lime Associtaion.)

Dr. C. C. Fletcher, of the U. S. Department of Agriculture, also an expert on soils, was another speaker attending the conference.

In the course of the sessions Tuesday it was learned that North and South Carolina head the list as using more lime than any other states in the south, but when it came to a question of research work on the subject Tennessee stood at the head of the southern states. Much valuable work along this and other agricultural improvement lines has been done in the University of Tennessee agricultural department under the supervision of Dr. Morgan.

Those attending the conference are: Dr. H. A. Morgan, Dr. W. H. McIntire, L. L. Graves, Thomas McCrosky, Prof. J. C. McAmis, Furman Smith, Dr. C. C. Fletcher, Washington; Prof. E. O. Fippen, Cornell University; H. S. Willingham, Atlanta; E. S. Mather, Columbia, S. C.; J. W. Grimes, Asheville; R. F. Hall, Washington; C. R. Wagner, Columbus, Ohio; A. S. Snow, St. Louis; W. R. Bailey, Woodleaf, N. C.; Prof. George Roberts, Kentucky State University; Prof. E. R. Hodgson, Virginia, Prof. T. B. Hutchison, Virginia; Dr. W. B. Ellett, Virginia, Prof. W. F. Pate, Raleigh, N. C.; Prof. C. B. Blockwell, South Carolina Experiment Station.

Reduction Freight Rates Discussed

Robert F. Hall, general manager of the Lime Association reports: "One of the immediate results of the meeting is the intention on the part of the agricultural authorities in the states involved, to present to the freight rate-making officials responsible for that territory, some recommendations covering a readjustment of freight rates on agricultural lime. It appears that there are many instances of discrepancies in freight rates where by one route the rate into certain districts is higher than by another. Many specific instances of this sort were brought to the attention of the conference. It is desired that manufacturers, whether members of the association or not, who are aware of instances in which there exist such discrepancies in freight rates, report such cases to us as promptly as possible. At an early day there will be a meeting of the agricultural representatives of all the States of the Southeastern District of the Lime Association, at which this matter will be thoroughly considered and a complete analysis of the rates from producing points to distributing points in these States will then be compiled for presentation to the proper officials of the Railroad Administration.

"The necessity of the cooperation of manufacturers of lime in these States is obvious, and the more help they extend to this effort, the more satisfactory the results will be. If any companies desire more detailed information as to what it is proposed to do, we shall gladly furnish it, but for general purposes we believe foregoing is sufficiently explicit to develop all the cases of excessive rates now appearing on all the published tariffs in that territory."

Armours Buy Large Plant of Mineral Products Corp.

SALT LAKE CITY—Official announcement has been made that the Armour Fertilizing Works, the third largest manufacturers of fertilizers in the United States, had purchased all of the interests of Howard F. Chappell and the United States Smelting, Refining and Mining Company in the Mineral Products Corporation Confirmation of the successful closing of the big deal is given by E. W. Senor, land and mining attorney, who is the Salt Lake representative of the Armour interests. While the exact amount involved in the purchase has not been made public, it is understood to be approximately $1,000,000.

The Armours were already holders in a small way in the Mineral Products Corporation, when it was controlled by the Chappell and United States Company's interests. The Mineral Products Corporation is the largest producer of potash from alunite in this country.

Architects Advising Clients That Market Is Most Favorable Now

April Cement Orders Double That in Same Month, 1915—June Will Be Big Construction Month

COOPERATION of a sort heretofore considered unattainable between factors controlling transportation, demand, supply and consumption of building materials has made it possible to mark June the starting month for the active 1919 building season, according to The Dow Service Daily Building Reports.

Building investors may look for some downward price changes between now and the first of the month, notably in hollow tile, neat cement mortar, hydrated lime in cloth and possibly in barrel lime, although in the latter case price reductions are not wholly assured because the lime manufacturers have been absorbing the higher carrying charges due to lifting of free lighterage during the war. The fact that hydrated lime in cloth bags only will be affected by the change is attributed to the refusal of the companies to lighter this material in paper bags. It was not possible to ascertain on Saturday whether the restoration of free lighterage would result in a change downward in the price of cement.

One of the most significant indices of sharp turn for the better in the general building situation is that in cement. Leading companies, showing inquiry sheets and order books, reveal that inquiry in the first four months of this year are three times what they were in twelve months of 1915 and that actual orders in April were more than twice what they were in April of 1915. The fact that the volume of road construction that was expected earlier in the year has not yet matured has real significance in that the heavy volume of cement inquiry and orders is reflective of the notable change in the building outlook in this market especially.

Architects are advising their clients that the building market is more favorably inclined toward them today than it has been in three years or will be in the next five years. They are now able to show: Known abnormal demand, known sub-normal supply, and price levels at consequent artificially low levels. Price of lumber already advancing, common brick held down to present levels by conciliation, steel at levels which leading officials declare cannot be forced lower in the light of potential demand and current wage scales, Portland cement at bottom levels commensurate with operating costs and increasing demand, glass on a 50 per cent production basis. Linseed oil advancing, plaster handicapped by lack of barges, stone and gravel in at least a partially stabilized market, prospective building code revisions to help cut cost of building construction relating to brick, concrete and lumber, free lighterage restored and a possible downward movement in hollow tile. Supplemental building commodity mills, like pipe, fabricating plants, are hungry for business and are making concessions that will probably not have currency more than three months at the outside.

The architects point to the last restraining factor in a free building market as being the difficulty of obtaining building loans, but according to intimations given by conspicuous mortgage and banking officials to them last week, there will be a decided change for the better in this regard before the first of June. Financial men say they know of no reason why building money should not be much freer after the first of June so that construction work may proceed without further hamper.

Louisville Building Interests Will Initiate Construction Work

To Prove Faith in Present Prices and Conditions by Action

LOUISVILLE, Ky.—Excellent building weather this spring has resulted in road and building activity progressing even more rapidly than had been expected. Reports from lime and cement manufacturers, quarry, sand and gravel men, building supply handlers and the general building industry, show that business should be at or near normal about June 1st.

Louisville building interests, including the manufacturers and handlers of supplies, have raised funds with which to start a big publicity campaign to encourage building. This campaign will start within a few days, and will include full page advertisements and reading notices. The contractors and supply men have recently formed a co-operative company for the purpose of erecting a $300,000 apartment house in the East End, this being done to encourage building and get things started.

A report of prospective building operations for the country given out in Washington a few days ago estimated Kentucky operations at $13,000,000 for 1919. These figures appear to be far too low. While only a small percentage of the work in prospect may be handled, at the same time the prospects total closer to $25,000,000 to $40,000,000 as a whole.

Louisville is very short of housing facilities, due to a rapid increase in population during the war in connection with Camp Taylor and Camp Knox, and natural growth. Rentals have advanced from 18 to 30 per cent, and modern homes and apartments are very hard to find either for rental or purchase. Hotel accommodations are also very scarce. Factories are not to be had, as the Louisville Industrial Foundation has filled up all of the available plants in the city, and is at a standstill.

Among a few of the more important projects in the city and state at this time are:

A Federal Hospital at Dawson Springs, Ky., to cost in the neighborhood of $4,000,000.

Factory loft building of the Louisville Industrial Foundation, to be 10 stories or more, costing $1,500,000.

Improvements under way at the plant of the Louisville Water Co., $1,500,000.

New Scottish Rite Masonic Building, $1,000,000.

New Hotel at Lexington, Ky., costing $1,000,000.

Government buildings in rural districts, $500,000.

In addition to major projects a good deal of small residence building is under way, and several apartment houses are being projected. There is an excellent demand for the rural districts, where the farmers have money, and where the bankers are willing to lend on guaranteed wheat prospects.

It is largely a question as to how much of this work will develop as to whether or not the cement, rock, sand, gravel, gypsum and other manufacturers will be busy. It is argued that building materials and labor are about as low as they can possibly go without reductions either in coal, freight rates, food and clothing. Prices appear firm, and it is argued that conditions in 1920 will be no more favorable for building than they are today. There is no oversupply of labor in Louisville, and in fact Louisville is recorded as one of six cities showing a shortage.

Public Opinion on the Prices of Road Material in Illinois Changes

Governor's Foremost Advocate Advises Him to Stop Quibbling and Do Some Building

THOSE WHO HAVE FOLLOWED controversy between the state authorities of Illinois and the producers of building materials will read with interest the following editorial, which headed the editorial columns of the Chicago "Tribune," May 5. The "Tribune" has been the foremost advocate of Governor Lowden's policy of knocking the producers to reduce prices, so the change of front is notable.

Moreover, the argument is so forcibly worded that it can very likely be used on hesitating highway officials in other states. The unusual early May rainfall has brought home to people who use the roads the fact that good roads are desirable even at present prices. The Tribune editorial reads as follows:

ROAD NEEDS AND ROAD COSTS

While it is true that the cost of road building has gone up, it is no less true that Illinois stands sadly in need of roads.

It may be discomforting to the people to learn that their $60,000,000 road fund will not buy as much as they expected, but it is vastly more discomforting to know that our roads each day become more and more impassable.

There is little probability that prices will come down. There is every certainty that the roads will grow worse. Both ends are being played against the middle. Illinois is in the middle.

Gov. Lowden is to be commended for his stand in behalf of $60,000,000 worth of roads; no waste; no unearned profits. The governor is entirely correct in his determination to make every dollar buy a dollar's worth of road. But we must not confound high prices with unearned profits; waste and advanced costs are not interchangeable terms. When the governor promised the voters that their $60,000,000 would be spent as estimated he could not know that within the year the cost of road building was to leap astonishingly.

We are aware that Gov. Lowden expected to get 4,800 miles of roads for the $60,000,000 when the bond issue was approved and that failure to produce this mileage would entail suspicion and criticism. But 4,800 miles of roads for $60,000,000 was an estimate made under cost prospects now obsolete. With the most circumspect attention to details, the governor cannot how hope to stretch $60,000,000 over 4,800 miles of highways when the cost of materials has advanced out of bounds.

The governor still hopes for better prices. We would like to participate in that hope, but the state of the universal market makes it seem futile. It is not only road material that has gone up—everything. Waiting for a return to pre-war prices does not seem to offer much reward.

But in the meantime, while we are waiting for prices to drop, we are not wanting in evidence of the swift deterioration of the highways. And herein is the other side of the picture.

The $60,000,000 voted for the improvement of roads comes out of the pockets of the automobile owners. It was one of the chief arguments for the bond issue that the average taxpayer would not be called upon to contribute a cent directly to the road program. The whole cost is to be borne by the motorists through the payment of license fees.

Obviously such roads were to be of some use to the motorists thus called upon to pay for them. Of what use to pay $60,000,000 and still continue to travel over roads no better than before?

To what purpose are roads hard surfaced? Quite naturally so that vehicles may pass in greater comfort to themselves and their occupants. If a good road preserves the quality of a vehicle it follows that a poor one destroys it. Bad roads are a certain destruction to tires and contribute to the general unrepair of the automobile. Good roads keep a car going; bad ones keep a motorist paying repair bills.

The state, or rather the motorists of the state, may save a certain percentage of their $60,000,000 by waiting for better materials prices; but they will spend a great deal more in repairs and new tires. It is one cost balanced against another. But inasmuch as the motorists are committed to the cost of good roads, is it just and fair to commit them also to the cost of motor repairs for the very escape from which they approved the former?

We repeat that we should like to join Gov. Lowden in his hope for better prices. But high prices are not confined to the Illinois road program; they are universal; and we believe they will remain so. We believe that with roads going worse every day and motor repairs multiplying, the least of the evils is to be chosen in doing the best we can; build all the roads we can with honesty and good management.

It is too bad that the original program must suffer, but we gain nothing by grouching; Illinois needs roads immediately. We hope the governor will see fit to press the program.

Illinois Lets Contracts For 650 Miles of State Highways

Governor Lowden Has to Admit the State Needs Roads More Than Interest on Cash Available

ROAD BUILDING CONTRACTS for 650 miles were let May 6 by the State Department of Public Works. The average price per mile, as announced by Director of Public Works Frank I. Bennett, is $27,900, as against an $18,000 estimate, when the $60,000,000 bond issue program was made.

The contracts were let with the explicit understanding that Governor Lowden stands for present prices only because of the tremendous demand for road building and the necessity of employment of labor.

Freight Rates a Factor

Director Bennett issued a statement on behalf of the administration, saying:

"The cost of the sections awarded averages about 40 per cent higher than pre-war prices Of this increase 10 per cent consists of increase of freight rates and an added thickness of one-half inch additional concrete.

"One-third of this 40 per cent increase consists of increased price of cement. The average price for the whole country for cement at the mills for 1914. as shown by the Geological Survey Division of the Department of the Interior was 92.7 cents per barrel. Illinois prices were and are somewhat below the average. The bids received by the state for cement are $1.70 per barrel, with a further discount of 5 cents per barrel for prompt payment, which makes the increased price of cement about 79 per cent over the 1914 average price.

"The remaining two-thirds of the increased cost is partly due to increased labor and equipment, cost of construction, and partly due to increased cost for stone and gravel—the latter being slight.

"High as these prices are, it may be some comfort to know that they are below the average prices for similar roads, contracts for which have been let in recent months in other states.

Sand and Gravel Associations Add Engineer to Staff

Indiana Association Gets Services of Well Known Gravel Road Expert

R. C. YEOMAN, head of the Highway Extension School of Civil Engineering, Purdue University, and traveling extension worker for good roads in Indiana, has been appointed extension engineer of the Indiana Sand and Gravel Producers' Association and consulting engineer of the National Association of Sand and Gravel Producers.

In the Indiana association he will devote his attention to the promotion of the uses of sand and gravel in every legitimate way, and for this work the association considers it has made a fortunate selection. His experience as head of the extension school of the university makes him all the more valuable for the association, as the good work which he has accomplished in the past two years while working for good roads throughout the state can be continued without interruption. Because of his position as consulting engineer to the national association, every sand and gravel producer will have the advantage of the work he is undertaking.

Mr. Yeoman is a graduate of Purdue University, obtaining the degrees of B. S. C. E. in 1907 and C. E. in 1909. He was assistant instructor in the civil engineering and testing laboratory at Purdue, 1907 to 1909, during part of which time he was also draftsman and agent for the National Bridge Co. of Indianapolis. In 1909-10 he was professor of civil engineering at Valparaiso and from 1911 to 1917 dean of engineering. He was city engineer of Valparaiso in 1915 and inspector of concrete roads in Canada for the Portland Cement Association in 1917. This was followed by his appointment as highway engineer and associate professor of highway engineering of Purdue University in December, 1917, which position he continued to hold until March 1 of this year, when he accepted his present positions with the sand and gravel associations.

Some other important work done by him was as designing engineer and superintendent of construction of the Knox sewer system in 1913, and as assistant supervisor of the Government Concrete School at Purdue in 1918. He is a director of the American Association of Engineers.

R. C. Yeoman

Foreign Consumers of American Cement

WASHINGTON, D. C.—A report, showing the destination of every barrel of cement exported during the month of February, has just been secured by the Washington Bureau of ROCK PRODUCTS from the Department of Commerce. The report shows Brazil to be our largest customer for cement, closely followed by Panama in quantity, although Argentina shows second in value. The report, as prepared by the experts of the department, is as follows:

EXPORTS

Countries	Barrels	Dollars
France	6,667	21,091
British Honduras	9	39
Canada	546	2,570
Guatemala	746	2,421
Honduras	1,062	3,321
Nicaragua	1,381	4,654
Panama	33,928	68,369
Salvador	554	1,941
Mexico	5,829	20,627
Jamaica	350	1,078
Trinidad	3,269	10,485
Other British West Indies	151	604
Cuba	16,946	58,443
Virgin Islands	510	2,341
Dutch West Indies	500	2,200
French West Indies	165	531
Haiti	83	252
Dominican Republican	2,307	7,201
Argentina	21,941	71,904
Bolivia	1,870	6,728
Brazil	36,875	111,660
Chile	6,706	20,186
Colombia	2,400	8,689
Ecuador	1,728	5,800
British Guiana	400	1,232
French Guiana	100	370
Peru	16,223	53,063
Uruguay	2,484	10,518
Venezuela	140	564
Straits Settlements	2	20
Hongkong	6	12
Australia	37	142
Philippine Islands	240	900
British West Africa	1,225	3,921
French Africa	3,443	12,595
Total	170,823	516,472

Extra Fire Insurance Now Needed to Cover Increased Costs

WASHINGTON, D. C.—Business men should take steps to protect themselves from serious loss in case of fire by keeping their insurance at an amount as nearly as possible commensurate with the cost of replacement. Most of the fire insurance policies now effective throughout the country are for the amounts for which the properties were originally underwritten on policies taken out prior to the war.

Following recent large fires, when the face of the policy was paid, it was found to cover less than 50 per cent of the cost of replacement.

Building construction has increased from 50 to 80 per cent in cost, but in most cases owners have not increased their insurance. Insurance men have sent notices to clients hinting at the advisability of a revaluation of buildings and replacement cost of other property, especially machinery, and fire insurance companies, it is declared, recognize the increased value of buildings and will accept additional insurance.

Before increasing insurance, however, property owners should consult builders or friends who understand values and the appreciation in buildings, in order not to overinsure. As a general rule, however, any building not depreciating too greatly from age is worth not less than 50 per cent more today than three years ago.

U. S. Is Building Seven New Concrete Ships in Own Boat Plant

OAKLAND, CALIF.—One of the largest concrete shipbuilding plants in the United States has been established by the government on Government Island in the estuary, near Oakland, Calif. Seven 7,500-ton tankers are to be built there for the government. One of these tankers has already been "poured" and another is in process of pouring. The first launching will take place about April 20.

Many improvements in the cement mixture going into stone ships have been made since the "Faith" was launched. The body of the concrete, for instance, is now made of "puffed" brick, crushed to quarter-inch mesh, instead of crushed rock. This gives the vessel greater buoyancy and resiliency than is possible with the old formula, according to the San Francisco Shipbuilding Co., in charge of construction at Government Island.

However that may be, the fact remains that the "Faith" piloted the way for the fleet of stone ships now being built and is a recognized factor in American shipping.

NEW MACHINERY AND EQUIPMENT

World's Record in Rock Crusher Sizes

OVER A THOUSAND quarry operators and other interested men journeyed to the works of the Traylor Engineering & Manufacturing Co. at Allentown, Penn., on April 28, and the rest of the week, to see "the largest stone crusher in the world." This is the 60-in. "Bulldog" gyratory just completed for the Michigan Limestone & Chemical Co., Rogers City, Mich.

Gyratory an American Development

The gyratory rock crusher is distinctly an American achievement. In 40 years it has developed from what would now be a No. 3 machine with two receiving openings 7x28-in. and a capacity of 10 tons per hour to this No. 60 with two receiving openings each 60 in. by 18 ft. and a capacity of 2,500 tons per hour.

The three men responsible for this achievement in gyratory crushers are W. J. Roberts, president of the Traylor Engineering & Manufacturing Co., Richard Bernhard, chief engineer, and L. J. Hewes, manager of the Chicago district of the company. Mr. Hewes helped to build the original gyratory 40 years ago and helped to design the plant where the new No. 60 is to go, as well as the machine itself.

This machine is designed to take the whole output of the biggest quarry in the world. Twelve steam shovels will feed it. Trains of 15-ton cars—10 cars to a train—move the stone from quarry to crusher. Sixteen trains are always on the tracks.

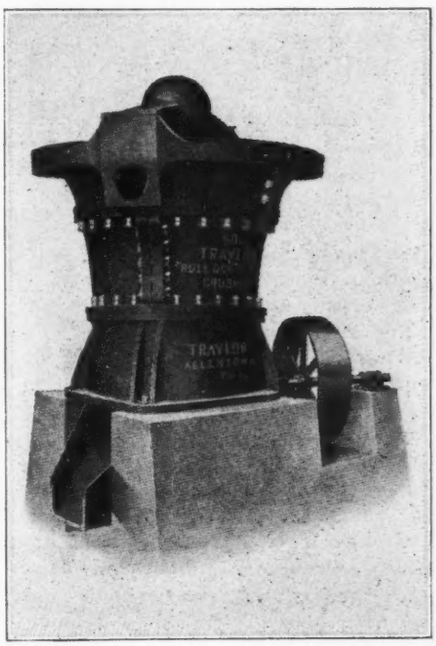
Some Special Features

The head and shaft alone weigh 56½ tons. The eccentric has the largest babbitted bearing in the world. It requires 1½ tons of locomotive babbitt metal to pour it.

A novel feature in this and all the "Bulldog" type of crushers, which has been patented, is the lower journal on the main shaft. This runs in an eccentric in a separate steel bearing having a universal joint, self-aligning and renewable from stock.

It requires seven barrels of oil to fill all the oil wells. The circulation of oil is registered by a gage glass on the outside of the machine. The temperature of the oil is registered by a thermometer, where the oil overflows from the eccentric. There are only two places in the machine which have to be lubricated from the outside—the eccentric bearing and the suspension bearing at the top of the machine. Neither one of these, it is claimed, requires attention oftener than once a month.

For the first time in the history of gyratory crushers the circulation of the lubricant was designed not only to take care of the eccentric bearing and both counter-shaft bearings, but to form an oil ring entirely around the eccentric at the top, making it impossible for dust to get into the bearing, as it would be caught in the oil ring and carried over into the settling well. The entire lubricating system is designed to permit the oil to spread out and cool rather than to confine it.



World's largest gyratory crusher

Some Details

The crusher is arranged for a maximum discharge opening of 9 in. on the open side and a movement of 1¼ in. for the head at the discharge point of the concave. The main shaft is 40 in. in diameter at the bottom of the head and 21 ft. long. A hole is bored its entire length so that it can be used for supplying lubricant to the eccentric.

The crusher head is made in two parts, which are interlocked and securely held in place by means of a zinc. The concaves are made in three tiers, 24 to each tier. The two upper sets are 4 in. thick and the lower set tapers from 4 to 5 in. on the bottom.

The counter shaft is 7½ in. in diameter and will be driven by an 18-groove rope sheave for 1¼-in. rope. The discharge spout is ¾-in. steel plate, and is lined with heavy sectional lining plates.

This immense crusher was built, inspected and accepted, including the preparation of all drawings and the making of the patterns, all in 3½ months' time from the date of the order. It was operated empty at the assembling plant by a 100 h. p. motor. It is estimated that a 250 h. p. motor will run it loaded.

It weighs about 400 tons. The largest shipping section weighs 230,000 lbs. It is shipped on a special 4-truck car belonging to the United States Government and built to handle the largest pieces of ordnance.

Other pictures and data regarding this extraordinary crusher will be published in a subsequent issue.

War Produces New Blasting Machine

QUARRYMEN may be interested in the recent development by the engineers of the War Department of two hand-operated firing machines, one capable of firing a maximum of 300 electric detonators and the other a maximum of 500 detonators. The cost of such machines is said to be little if any more than that of the ordinary machines designed to fire 20 to 30 detonators. They differ little in size or appearance from those now in general use at quarries.

An Artificial Magnesite

AN ARTIFICIAL MAGNESITE, claimed to have the desirable refractory qualities of imported crude magnesites, is covered by a patent (U. S. 1,270,819) granted to J. O. Handy and R. M. Isham, Pittsburgh. They calcine a dolomite in a rotary kiln so as to remove all the carbon dioxide without dead burning. The calcine, granulated to the size of a pea, is leached with cold water to remove the calcium oxide down to from 3 to 10 per cent. Additions of basic slags and clays are then made and the material is reburned at 1550 deg. C. to remove the water of hydration and carbon dioxide. The final product should have 85 to 88 per cent MgO, 3 to 10 per cent CaO, 4 to 8 per cent of silica and a little iron and alumina. The small amount of lime is necessary for bonding yet it is so small that danger from slacking is absent.

General News From The Rock Products Markets

May Spend $9,000,000 in Raising Galveston Grade

GALVESTON, Texas—On top of the several million dollars which the city of Galveston has already expended since the great storm of 1900, in constructing a protective sea-wall and raising the grade, it is planned to use approximately $9,000,000 in making the city still further immune from possible overflow from the Gulf of Mexico.

Whether this additional project of protection will be undertaken depends largely on the recommendations of the United States army engineers. A hearing has been recently held here in connection with a survey for the proposed raising of the grade of the city and island east of the giant causeway that connects Galveston with the mainland to 10 ft. above sea level.

California Building Work is Growing Apace

OAKLAND, Calif.—The after-the-war wave of building activity has at last reached the Pacific coast. Figures compiled by the division of information and education of the United States Department of Labor show that in California projects aggregating $103,000,000. which were held up by the war are now ready for consummation.

In the various cities throughout the state there is a great demand for new homes, new apartments, and new stores, and many business firms are adding to their present plants. In Oakland, California, $869,000. worth of work is now in course of preparation and rock sales have already increased 40 per cent over those of last year.

The Pacific Coast District has maintained a fairly constant volume of business since entering upon the period of readjustment.

The outlook is especially good for road-building, including the production of materials and the sale of road-building machinery. Many of the larger municipalities will do a large amount of street work under public proceedings during the summer months.

In a number of cities, also, bonds are to be issued for the erection of schools, hospitals and other public buildings. In Los Angeles financial arrangements have been completed for the erection of a hotel to be known as the California Hotel, at an estimated cost of $1,250,000. At Santa Barbara, the construction of a breakwater is planned. In Olympia, Washington, work on new buildings to cost $745,000. will start early in May.

Demurrage Reduced

OFFICIAL ANNOUNCEMENT has been made of a reduction in present car demurrage to $2 per day for the first four chargeable days after 48 hours free time allowance, and $5 a day for each subsequent day. The average agreement has been restored, but in the form of separate agreements for inbound and outbound cars. Shippers will not be permitted, as before, to offset debits against inbound cars by credits earned on outbound cars, or vice versa.

Big Cement Plant in the Argentine

WASHINGTON, D. C.—Ambassador F. J. Stimson to Argentina has reported that as a result of a visit made to that country in 1915 by representatives of a Boston firm, an immense Portland cement plant is now in operation at Sierras Bayas. The plant is located at some abandoned limekilns about 200 miles south of Buenos Aires. It is declared that not only does the rock contain limestone suitable for cement, but that enough chips remain from the old lime works to make partly-crushed material for thirty years to come. Suitable clay is also to be found at this location.

The practical difficulty in placing this cement on the market lay in the high freight rates prevailing in Argentina, whereas cement could be shipped from New York in normal times at only $4 per ton. Satisfactory arrangements have now been made, however, with the Southern Railway for a relatively low rate, not only on the product of the plant, but on the coal sent up from Buenos Aires as well.

The plant is most up-to-date in every particular, notably in its complete application of the principle of transmuting the waste kiln gases by means of boilers and steam power into electricity, so that no coal is used for power purposes.

The present price of Portland cement in Buenos Aires is $18 to $20 gold per barrel. It is planned to fix the first price of the product of the Argentine Cement Co. at $12 gold, and an ultimate output of 1,000,000 barrels per annum has been predicted for the company. It is declared that there is no country in the world where there is so great a demand for cement, there being no gravel to make roads, little timber for building purposes, and enormous public works in process of construction.

Indianapolis Gravel and Sand Market Slow

INDIANAPOLIS, Ind.—Right now the movements in sand and gravel are slow, owing to the fact that no work was carried over from last year, and new projects are not yet under way. However, the outlook is very encouraging, and the hesitation due to the hope that there will be a reduction in the price of material and freight rates, will soon be dissipated. Road building projects are in safe hands, if one considers the high character of the men who compose the State Highway Commission, and the people have confidence in the projects undertaken. The present expansion of a good many public utilities with the necessity of buying, will no doubt be the cause of a better market.

While material other than rock products, during the war period, advanced in some cases to 125%, sand and gravel advanced in almost every district only 50%; while machinery costs advanced about 119%, labor 85% and overhead expenses, by reason of limited output, advanced from 50 to 75%.

The board of commissioners of Marion county have sent a letter to Governor Goodrich, urging him to continue his efforts to bring about a reduction in the cost of cement used in the construction of roads in Indiana.

Citizens of Columbia township, Whiting county, held a special election and voted for the construction of twenty-two miles of paved roads.

Army Trucks for Federal-Aid Roads

AN EXTRA CONTRIBUTION of materials running into the millions of dollars will be made by the Federal Government to road building in the States through the terms of a recent amendment to the Federal aid road act empowering the Secretary of War in his discretion to transfer military equipment not needed by the Army to the Department of Agriculture for use in highway construction. The Judge Advocate General's Office of the War Department has decided that the material so transferred can not be charged for. The War Department has informed the Bureau of Public Roads that it has a large number of surplus motor trucks available for this purpose, and State highway departments now are being asked by the bureau what quantities they can put to use. The Bureau of Public Roads officials believe there will be sufficient to meet all demands from the States.

General News From The Rock Products Markets

Texas Highway Building Boosts Gravel Business

AUSTIN, TEXAS.—As a direct result of the unprecedented activity in constructing good roads in Texas many deposits of road materials are being developed. The laboratory for testing road materials at the University of Texas tested during the period between January 1 and May 1 this year, road materials from 29 counties. The number of tests from each county ranged from one to ten. A statement follows:

"The impetus given to road building in Texas since the signing of the armistice is clearly shown by the increased number of tests since the first of the year.

"One hundred and ten tests have been made since January 1, consisting principally of sand and gravel for road building and concrete purposes, but among these tests are asphalts to be used on roads in Houston and McLennan counties, cements to be used on roads and in bridges, steel for use in reinforced concrete.

"The enthusiasm for good roads in Texas is statewide, as shown by the list of counties and the number of tests made from each county:

"The final and conclusive test for a road material on a given road is the manner in which it stands under the traffic, but a good idea as to its probable worth can be obtained by laboratory methods, and where there are several available materials and a doubt as to which is the best, laboratory tests of the different materials may be of great value to a county in determining which of a number of available materials to use."

Scheme For Mileage Basis of Freight Rates Much Opposed

INDUSTRIAL LEADERS of Illinois are preparing to make vigorous protests against the proposed plan of the United States Railroad Administration to make sweeping changes in the present freight tariffs. It is claimed that the proposal to change rates, which originated on a plan made in Indiana, has made it impossible to get business on a settled basis, and that if the proposed shifts are made the result will be disastrous to all shippers in Illinois.

Another protest, which is to be filed with the Interstate Commerce Commission, has been prepared by steel producers, who charge that they are unable to enter the export field because of rates which favor the Pittsburgh district at their expense.

In the complaint regarding the general change in freight tariffs it is pointed out how the railroads aided the development of Illinois in the early days, with the result that the investments in farms in the state are now estimated at $4,718,321,000, with an additional $1,943,836,000 invested in industries.

Lime Association to Meet June 18-19

THE ANNUAL MEETING of the Lime Association is announced for June 18-19 at the William Penn Hotel, Pittsburgh. This is the same place set for the meeting in February, which was postponed. This is the first annual meeting of the new Lime Association. Its good work during the last year of strenuous business conditions deserves a 100 per cent attendance.

Sand Diggers Begin Work on the Ohio River

LOUISVILLE, Ky.—Louisville sand and gravel concerns took to the water during the month, after a layoff of several months. Stocks of sand and gravel held out nicely during the winter, but with a good demand in sight, and stocks a little low, the sand and gravel digging companies took advantage of open weather and good boating stages to start operations on the Ohio.

The E. T. Slider Co., was busy for several weeks in overhauling the machinery on its large digger, towboats, derrick boats, etc., and getting in shape for rapid handling. The Ohio River Sand Co. recently started handling sand and gravel up its incline, after making numerous improvements. Digging sand from the bottom of the Ohio is now in full swing.

Ohio River Sand Co. digger limbering up for season's work

Diamond Match Company May Close Potash Works

STOCKHOLDERS of the Diamond Match Co. reelected directors April 24, President W. A. Fairburn told shareholders that the operation of the muriate of potash plant of the company is a matter of doubt and that the potash works at Salt Lake City must be considered a war project and be closed unless the government protects the potash industry. He said that business has declined since the signing of the armistice and that some slackening must be expected this year.

Little Town Builds While Big States Quibble

WHILE IN WHITEWATER, WIS., the writer found this small town of approximately 3,500 population to have some of the finest concrete streets in the country. It does one good to see this work of going ahead putting in concrete streets in small villages, while all large cities are scrambling and squabbling on account of building material being too high.

The work was done by E. L. Bartlett of Watertown, Wis., and he should receive high comment for same.

Beloit Sand & Gravel Co.,
Per A. A. Rotstein,
Sales Manager.

Rockford, Ill., April 29.

The Rock Products Market

Agricultural Limestone Wholesale at Plant, per Ton

EASTERN:

Coldwater, near Rochester, N. Y.—Analysis: $CaCo_3$, 56.77%; $MgCo_3$, 41.74%—90% thru 100 mesh; ppr., 4.50; bulk 3.00

Hillsville, Pa.—Analysis, $CaCo_3$, 85%; $MgCo_3$, 1½%—(70% thru 100 mesh) in 80 lb. ppr. bags, $4.50; bulk..... 3.00

Lime Kiln, Md.—50% thru 50 mesh; bulk 4.00

Pownal, Vt.—(50% thru 100) Analysis, $CaCo_3$, 90%; $MgCo_3$, 5%; ppr., $4.50; bulk 2.75

Syracuse, N. Y.—Analysis, $CaCo_3$, 91.50%; $MgCo_3$ 3.16%—(100% thru 20 mesh; 95% thru 50; 68% thru 100); sacks, 3.75; bulk..... 2.25

Walford, Pa.—(70% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 100% thru 10 mesh; 50% thru 4 mesh) ppr. sack, 4.50; bulk.. 3.00

West Stockbridge, Mass.—(50% thru 100) Analysis, $CaCo_3$, 90%; $MgCo_3$, 5%; ppr., $4.50; bulk..... 2.75

CENTRAL:

Alton, Ill.—(Pulv. and 90% thru 50 mesh; 90% thru 4 mesh) Analysis, $CaCo_3$, 96%; $MgCo_3$, .75%..... 2.00

Bedford, Ind.—(90% thru 10 mesh) Analysis, $CaCo_3$, 98.5%; $MgCo_3$, 0.5% 1.75

Canton, O.—100% thru 10 mesh; 49% thru 100; 59% thru 50..... 3.00

Columbia, Ill., near East St. Louis —(¼" down) ..... 1.25@1.80

Elmhurst, Ill. — (Analysis, $CaCo_3$, 35.73%; $MgCo_3$, 20.69%) ⅛ in. to dust ..... 1.00@1.25

Lannon, Wis.—(90% thru 50 mesh) Analysis, 54%, $CaCo_3$; 44%, $MgCo_3$ 2.00

Marble Cliff, O.—(50% thru 100 mesh) Analysis, $CaCo_3$, 86%; $MgCo_3$, 8%.... 3.00

McCook, Ill.—(100% thru ¼" sieve; 78.12% thru No. 10; 53.29% thru No. 20; 38.14% thru No. 30; 26.04% thru No. 50; 16.27% thru No. 100) Analysis, $CaCo_3$, 54.10%; $MgCo_3$, 45.04% 1.00

Milltown, Ind.—Analysis, $CaCo_3$, 98% 1.50

Montrose, Ia.—(90% thru 100 mesh).. 1.25@1.35

Muskegon, Mich.—(90% thru 50 mesh) Analysis, $CaCo_3$, 53.35%; $MgCo_3$, 43.27% 2.50

Piqua, O.—(50% thru 100 mesh)..... 2.50@4.00

Rockford, Ill. — Analysis, $CaCo_3$, 53.75%; $MgCo_3$, 44.35%..... 1.25

Stolle, Ill. (near East St. Louis on I. C. R. R.)—(Thru ⅛" mesh) Analysis, $CaCo_3$, 89.61 to 89.91%; $MgCo_3$, 3.82% 1.50

Stone City, Ia.—(50% thru 100 mesh) Analysis, $CaCo_3$, 98%..... .50

Toledo, O.—Analysis, $CaCo_3$, 52.72%; $MgCo_3$, 43%—(20% thru 100 mesh; 30% thru 50; 80% thru 100; 100% thru 5/32 screen)..... 1.80

Whitehill, Ill. — Analysis, $CaCo_3$, 96.12%; $MgCo_3$, 2.50%— 50% thru 100 mesh, bulk..... 1.50

SOUTHERN:

Cartersville, Ga.—Analysis: 96 to 98% combined carbonates—All thru 10 mesh with all dust in..... 3.00

Dittlinger, Tex. — Analysis, $CaCo_3$, 99.09%; $MgCo_3$, 40%.
90% thru 100 mesh..... 2.00
90% thru 4 mesh..... 1.00

Fletcher, N. C.—Analysis, $CaCo_3$, 75%; $MgCo_3$, 22%—(all thru 10 mesh; 50% thru 100 mesh)—100 lb. paper or 200 lb. burlap, $3.60; bulk..... 2.10

Grovania, Ga.—Analysis, $CaCo_3$, 95%; $MgCo_3$, none—50% thru 100 mesh.... 2.50@3.00

(Continued on next page.)

Wholesale Prices of Crushed Stone

Prices given are per ton. F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Auburn and Syracuse, N. Y.	.80	1.20	1.20	1.20	1.20	1.20
			Railroad ballast, 1.00			
Buffalo, N. Y.			$1.00 per ton, all sizes			
Burlington, Vt.	.....	.....	2.00@2.50	1.75	1.75	.....
Coldwater, N. Y.			Flux, 1.50@2.10			
Lime Kiln, Md.	1.00	2.00	1.85	1.65	1.45	1.25
North Leroy and Akron, N. Y.	$1.00 for all sizes, including R. R. ballast					
Walford, Pa.	.....	1.50	1.50	1.40	1.40	1.40
CENTRAL:						
Alden, Ia.	.40	.....	1.00	1.00	1.00	1.00
Alton, Ill.	1.85	.....	1.45	1.35	.....	.....
Belvidere, Ill.			1.00 for any size produced			
Bettendorf, Ia.	.....	1.35@1.50	1.35@1.50	1.35@1.50	(2300 lbs.)	
Detroit, Mich.			Various sizes $1.50 per net ton			
Dundas, Ont.	.60	1.05	1.05	1.05	.85	.85
Eden and Knowles, Wis.	.....	80	1.00	1.00	1.00	.....
Elmhurst, Ill.			80 for all sizes			
Greencastle, Ind.	.90@1.25	1.10	1.00	.90	.90	.90
Illinois, Southern	1.50	1.25	1.25	1.25	1.25	1.00
Kokomo, Ind.			Price range .90@1.00			
Lannon, Wis.			1.00 all sizes			
Lewisburg, O.	.80@1.00	.....	1.00@1.10	1.00@1.10	1.00	1.00
Lima, O.			1.10 for any size			
Linwood, Ia.	.60	1.05	1.00	.91	.91	1.00
Mankato, Minn.	.....	.....	.....	1.50	1.25	.....
Mayville, Wis.	.75	.....	.....	1.00	1.00	1.00
Montrose, Ia.	.....	1.10@1.15	1.10@1.15	1.00@1.10	1.00@1.10	.....
Oshkosh, Wis.			1.00 in all sizes, Blue Limestone			
River Rouge, Mich.	.85@1.15	1.15	1.15	1.15	1.15	1.15
Rockford, Ill.	1.25	.....	.....	1.25	1.25	1.25
Sheboygan, Wis.			1.00 for all sizes			
Sherman and Hamilton, Wis.			All sizes $1.00 per ton			
Stone City, Ia.	.50	.....	(1-in. 1.40)	1.30	1.20	.....
Toronto, Can.	1.55	1.95	1.95	1.95	1.75	1.75
			These prices include 90c freight			
SOUTHERN:						
Cartersville, Ga.	.....	1.95	1.85	1.75	.....	1.65
Fort Springs, W. Va.	.75	1.00	1.40	1.60	1.30	.....
Linnville Falls, N. C.			All sizes, 1.35			
			Railway ballast 1.10 per cu. yd.			
Mascot, Tenn.	.....		1.00 (Chatts)			
Memphis Junction, Ky.			From 1.00 to 1.25, all sizes			
Winnfield, La.	.60	.....	1.60	1.60	1.60	.....
WESTERN:						
Atchison, Kans.	.50	1.80	1.80	1.80	1.70	1.70
			Rip-Rap, 1.30			
Blue Springs & Wymore, Neb.	.....	1.45	.....	1.35@1.40	1.25@1.30	1.20
Dittlinger, Tex.	.....	.....	1.20	1.00	.90	.....
El Paso, Tex.			.90 for all sizes			
Kansas City, Mo.	.60	1.35	1.35	1.35	1.35	1.35

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Birdsboro, Pa.—Trap	2.00	1.80	1.70	1.50	1.50	1.25
			Fine screenings, 1.25			
Branford, Conn.—Trap	.80	1.25	1.25	1.10	1.00	.....
Dresser Jct., Wis.	.50	1.25	1.25	1.10	1.00	.95
Duluth, Minn.—Trap	.75	1.40@1.50	.....	1.10@1.35	1.10@1.15	.....
Farmington, Conn.—Trap	.80	.95	.95	.90	.....	.....
Glen Mills, Pa.—Trap	1.00	1.40	1.70	1.55	1.40	1.40
Millington, N. J.—Trap	1.80	2.00	1.80	1.60	.....	.....
Montrose, Ia.—Trap	.....	1.10@1.20	1.10@1.25	1.05@1.10	1.00@1.10	.....
Morristown, N. J.—Trap	1.85	1.75	1.75	1.60	1.40	1.40
New Britain, Conn.—Trap	.80	1.40	1.35	1.30	1.10	.....
Richmond, Cal.—Trap	.50*	.....	1.40*	1.30*	.....	.....
Westfield, Mass.—Trap	.60	1.00	1.10	1.00	.90	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Brooksville, Fla.—Flint	1.00	.....	.....	2.50	.....	.....
Fair Oaks, Calif.—Cr. Bldrs.	.85	1.05	.95	.85	.85	.....
Hendlers, Pa.—Quartzite	.80	1.00	1.25	1.00	1.00	1.00‖
Little Falls, N. Y.—Syenite	.80	1.20	1.40	1.20	1.20	1.20‖
Middlebrook, Mo.—Granite	.....	.....	.....	.....	2.00	1.00‡
Richmond, Va. (Quarry)	1.00@1.75	1.40@1.75	1.40@1.75	1.40@1.75	1.40@1.75	1.40
So. Richmond, Va.—Granite	1.00@1.25	1.25@1.75	1.40@1.75	1.40@1.75	1.40@1.50	1.40@1.50
Stockbridge, Ga.—Granite	.50	2.00	2.00	1.90	1.85	1.75
White Haven, Pa.—Sandstone	1.00	1.20	1.40	1.20	1.20	1.20

*Cubic yard. †Agrl. lime. ‖R. R. ballast. §Flux. ‡Rip-rap. a 3-inch and less.

Agricultural Limestone Wholesale at Plant, per Ton

(Continued from preceding page.)

Memphis Jct., Ky.—(Analysis, $CaCo_3$, 95.31%; $MgCo_3$, 1.12%) average price	2.00
Keystone, Ala.—(90% thru 50 mesh) Analysis, $CaCo_3$, 99.50%; $MgCo_3$, none	1.25
Mascot, Tenn.—Analysis, $CaCo_3$, 52%; $MgCo_3$, 38%.	
(80% thru 100 mesh)	2.50
(80% thru 200 mesh)	3.50
(All thru 10 mesh)	1.75
Paper bags, $1.50 extra per ton; burlap, $2.50 extra per ton.	
Tyrone, Ky.—Analysis, $CaCo_3$, 93%; $MgCo_3$, 4%—90% thru 4 mesh	1.50@2.25
Winnfield, La.—(50% thru 50 mesh)	4.50
WESTERN:	
Cement, Cal.—Analysis, $CaCo_3$, 95%; $MgCo_3$, 1% (50% thru 100 mesh)	4.00@5.00
Kansas City, Mo.—(50% thru 50 mesh)	1.10

Miscellaneous Sands per Ton at Plant

Silica sand is quoted washed, dried and screened, unless otherwise stated.

GLASS SAND:	
Bowmanstown, Pa.—Glass sand	2.50
Cedarville, N. J.—Glass	2.50@4.00
Gray Summit, Mo.—Glass	2.00@2.50
Hancock, Md.—Engine and glass	2.50
Klondike and Pacific, Mo.—Glass:	
Contracts	2.00
Carlots	2.50
Mapleton, Pa.—Glass, dry	2.75@3.00
Massillon, Ohio—Glass	3.00
Michigan City, Ind.—Glass sand	.30
Millington, Ill.—Glass	1.75@2.00
Mineral Ridge, O.—Glass	2.10@3.00
Montoursville, Pa. — Glass, green, washed	2.00@2.75
Ottawa, Ill.—Glass:	
Large contracts	1.75
All others	2.00
Sands, Elk Co., Pa.—Glass sand:	
Selected, green	2.50
Thayer, W. Va.—Glass	2.50@3.00
FOUNDRY SAND:	
Albany, N. Y., District—Molding	1.65@1.75
Core	1.25@1.50
Brass molding	1.65@1.75
Sand blast sand	3.25@3.75
Allentown, Pa.—Core	1.40@1.50
Arenzville, Ill.—Molding fine	1.50
Bowmanstown, Pa.—Core	1.20
Molding, fine and coarse	1.50
Roofing pebble, washed	5.00
Cleveland, O.—Core, at pit	1.00@1.25
Cleveland, O.—Molding, delivered	2.70@2.95
Brick sand, at pit	.75
Brass molding, delivered	2.95
Delaware, N. J.—Molding	1.50@2.00
Franklin, Pa.—Brass molding	1.65
Molding (gray iron)	1.50
Gray Summit, Mo.—Molding	1.50@2.50
Greenville, Ill.—Molding coarse red	1.60
Hancock, Md.—Core and brass mldg.	1.65
Kansas City, Mo.—Core	.75
Klondike and Pacific, Mo.—Molding	1.50@2.50
Hellam, Pa.—Core	2.00
Mapleton, Pa.—Molding, fine and core, damp	2.50
Molding, fine, dry	3.00
Massillon, O.—Core; molding fine and coarse; traction	2.50
Furnace lining	3.00
Brass molding	1.50
Millington, Ill.—Core, furnace lining, damp	1.50
Roofing and stone sawing	2.00
Montoursville, Pa.—Core, molding fine, traction	1.25@2.00
Brass molding	1.50@2.25
Michigan City, Ind.—Core, bank	.30@ .40
Ohio—Various points:	
Fine molding	1.75@2.00
Coarse molding	1.50@2.00
Brass molding	2.00

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Ambridge and So. Heights, Pa.		1.25	1.25	1.25	.80	.80
Attica, N. Y.	.50	.50	.50	.65	.65	.65
Boston, Mass. (wharves)	1.25	1.00	2.50	1.75	1.65	1.50
Buffalo, N. Y.	.80	.80	.75	.75	.75	.75
Buffalo, N. Y. (Niagara River)	.85	.80	.80	.75	.75	.75
Morristown, N. J.	.60	.60	1.20	1.00	1.00	1.00
North Wilbraham, Mass.		.60*	2.00*		1.25*	
Philadelphia, Pa.		.95		1.40		1.25
Pittsburgh, Pa.		1.25		1.25	1.05	1.05
Shaw's Land'g, Meadville, Pa.		1.00				1.00
Washington, D. C.—Wharves	.75	.75	2.00	1.40	1.20	1.20
CENTRAL:						
Barton, Wis.	.75	.70	1.00	.70	.70	.70
Beloit, Wis.		.60			.60	
Chicago, Ill.		1.00@1.10		.90@1.10		
Cincinnati (Miami Gr.)	.90	.85			.85	
Columbus, O.		.65	.60	.70	.70	.65
Des Moines, Ia.	50@1.00	.50	1.50	1.50	1.25	1.25
Earlestead, Mich.	55@ .60	.55@ .60		.75@ .90	.75@ .80	.75@ .80
Elgin, Ill.		.30@ .40		All gravel, .30@ .40		
Escanaba, Mich.		.85	1.60	1.20	.85	.85
Fort Dodge, Ia.	1.05	1.00	1.80			1.80
Fort Jefferson and Mechanicsburg, O.	.50@ .60	.50@ .60	.50@ .60	.70@ .80	.70	.70
Grand Rapids, Mich.	.40	.45	1.00	.80	.70	.67
Greenbush, Lachine and Wing, Mich.		.35	1.25	1.11	1.00	1.00
Hawarden & Doon, Ia.		.50		(1.20, Hawarden)		1.00
Illinois, Northern	.60	.60	.60@ .70	.60@ .70	.60@ .70	.50@ .60
Indianapolis, Ind.	.50	.50		.65	.65	.65
Janesville, Wis.		.50			.60	
LeMars, Ia.		.60				1.10
Mason City, Ia.	.60	.50	1.45	1.35	1.30	1.25
		Railway ballast and road work, .40				
Milwaukee, Wis.		1.20 for all sizes				
Minneapolis, Minn.	.40	.40	1.25	1.15	1.10	1.00
Moline, Ill.		.60	1.00	1.00	1.00	1.00
Montezuma, Covington, Ind.	.75	.75	.85	.75	.75	.75
Oxford, Mich.		.65	1.15	1.05	.95	.95
Summit Grove, Ind.	.75	.75	.75	.75	.75	.75
Terre Haute, Ind.	.75	.75			.75	.75
Toledo, O.		.60 for all sizes				
Wabash Valley District, Ind.		All sizes, .75.				
Waupaca, Wis.		.35	.70	.70	.70	.70
Winona, Minn.		.70	1.60	1.10	1.10	1.10
SOUTHERN:						
Charleston, W. Va. (River)		1.20	1.30	1.30	1.30	1.30
Knoxville, Tenn.	.85	.85	1.35	1.35	1.35	1.10
Lake Weir, Fla.	.50					
Pelzer, S. C.	.55					
Waco, Texas	.67	.67		1.25	1.05	1.05
WESTERN:						
Kansas City, Mo.	.60	.60				
Lincoln, Neb. (on cars)	1.00	1.00	2.10	2.10		1.90
Pueblo, Colo.	.80	.60		1.50		
St. Louis, Mo.		1.20@1.25	1.50	1.30	1.30	1.25
San Francisco, Calif.		1.15	1.15 for all grades gravel			
Seattle, Wash.	1.25*	1.25*	2.00*	1.25*	1.25*	1.25*
Sherman, Mo.	.65	.90	.90	.70	.70	.65

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Attica, N. Y.	.45	.45	.45	.60	.60	.60
Boonville, N. Y.	.40@ .55	.40@ .55		.60		.45@ .60
Pittsford, N. Y.		.45@ .50	.45@ .50			
Yardville, N. J.		.50@ .75				
York, Pa.		1.00@1.10	(crushed rock sand)			
CENTRAL:						
Beloit, Wis.		60			.60	
Chicago District		Bank sand at pits, .05 cu. yd.				
Covington, Ind.					.60	.60
Des Moines, Ia.	Washed concrete mix., 25% gravel, .70; 50% gravel, .90					
Earlestead, Mich.				.65@ .80	.65@ .80	.65@ .80
Escanaba, Mich.			1.00 cu. yd., all sizes			
Grand Rapids, Mich.	.30					.40
Greenbush, Lachine and Wing, Mich.		.50	.50	.50	.50	.50
Indianapolis, Ind.		Washed concrete mix, .55				
Janesville, Wis.					.55	
Moline, Ill.	.80					
Oxford, Mich.	.65*	.65*	.85*	1.40*	1.30*	1.30*
Summit Grove, Ind.		.50 for all sizes				
Terre Haute, Montezuma, Ind.		Road Gr., .50; Concrete, .60				
Toledo, Ohio						.55@1.00
Wabash Valley District, Ind.		.75 for all sizes				
Waupaca, Wis.						.40
Winona, Minn.		Pit run gravel under 2-in., .70				
SOUTHERN:						
Howcott, La. (50% and up in rock content)						.65
Lindsay, Tex.		1.15			.44@1.00	
Waco, Texas				(Road Gravel)		.38@ .48
Rosenberg, Tex.	1.35*	.50*@ .75*				1.75*
Valde Rouge, La.		Sand Clay 50% metal on ⅜" screen, .60 per ton				
WESTERN:						
Pueblo, Colo.	.60	River Run, .60 unscreened				
St. Louis, Mo.						1.40
San Francisco, Calif.		.75				

* Cubic yard. B Bank. L Lake. || Ballast.

General News From the Rock Products Markets

New Ruling on Bills of Lading by I. C. C.

WASHINGTON, D. C.—Of great interest to both large and small shippers in interstate commerce is the action taken by the Interstate Commerce Commission in prescribing uniform bills of lading for use both in domestic and export commerce, to be used hereafter upon the lines of all carriers subject to the Act to Regulate Commerce The commission has just handed down its so-called bill of lading decision. This is declared by shipping interests to be one of the most important decisions ever rendered by the commission, for it deals with many questions of law and practice affecting the relations of shippers and carriers.

The commission's report does not deal with the negotiability features of bills of lading; this was taken care of in the Pomerene Act. It does, however, take up the fundamentals and history of the common law of the carrier's liability, and its contractual exemptions from and limitations of liability.

Authority is claimed to require carriers to comply with the provisions of the law respecting the issuance of bills of lading. to file with it the rules and regulations which they write into their bills of lading, to require that uniform rules and regulations be adopted by them, and to determine what are reasonable and nondiscriminatory rules and regulations.

The commission also holds, that while the commission's authority over bills of lading to non-adjacent foreign countries is more limited and attaches more indirectly than in case of bills covering domestic interstate traffic, or traffic to an adjacent foreign country, it nevertheless does have authority over the rules, regulations and practices of inland carriers subject to the Act to Regulate Commerce, when, and if, they join in through bills of lading to nonadjacent foreign countries, and it requires such rules and regulations to be published and filed.

Miscellaneous Sands per Ton at Plant

(Continued from preceding page)

Ottawa, Ill.—Brass molding	2.00@2.50
Ottawa, Ill.—Core, Steel Molding	1.75@2.00
Ottawa, Ill.—Roofing	1.75@2.50
Ottawa, Ill.—Sand blast sand	2.75@3.50
Ottawa, Ill.—Sawing sand	1.50@3.50
Ottawa, Ill.—Traction	1.75
Ottawa and Utica, Ill.—Furnace lin'g	.85@2.00
Molding, selected	1.50@2.50
Molding, coarse	1.75
Thayers, Pa.—Core and traction	2.00
Wedron, Ill.—Molding	.75@1.00
West Albany, N. Y.—Molding fine	1.75
Molding coarse	1.75
Brass molding	2.25
Thayers, Pa.—Molding, fine	1.00@1.25
Molding, coarse, furnace lining	1.00

Ground Gypsum Rock, per Ton, at Plant

Fort Dodge, Ia.	6.00
Garhutt, N. Y.	6.00
Grand Rapids, Mich.	6.00
Oakfield, N. Y.	6.00
Sandusky, O.	6.00

Jute sacks, $3.00 extra; paper, $1.00 extra.

Ground Rock Phosphate at Plant, per Ton

Centreville and Glover, Tenn.—B. P. L., 72% lump rock, ton, 2,240 lbs.	6.00@6.50
Centreville, Tenn.—B. P. L., 65% to 70%	7.00@10.00
Jacksonville (Fla.) District—Soft phosphate	10.00@12.00
(Add 2.50 for sacks)	
Mt. Pleasant, Tenn.	7.00@8.50
Mt. Pleasant, Tenn.—B. P. L., 70% washed (90% thru 100 mesh)	9.00
In 200 lb. burlap bags, 2.50 extra.	
Walls, Tenn.—B. P. L., 70%	7.50@7.75

New Highway Work Records Made in April

WASHINGTON, D. C.—During April, 1919, the Secretary of Agriculture approved project statements for 120 Federal Aid projects, involving the improvement of 923.53 miles of road at a total estimated cost of $16,261,326.51, and on which Federal aid in the amount of $7,528,550.68 was requested. This represents the largest number of project statements approved, the largest total estimated cost. and the greatest amount of Federal aid requested during any month since the passage of the Federal Aid Road Act. March, 1919, had surpassed all records in these items up to that month.

During April there were executed by the Secretary and the several State highway departments 55 project agreements involving the improvement of 521.51 miles of road at a total estimated cost of $4,626,415.48, and on which $2,039,614.99 Federal aid was requested and set aside in the Treasury. In addition, agreements to cover 72 other projects were placed in process of execution during the month.

Up to and including April 30, 1919, project statements for a total of 1.057 projects had been approved, after deducting all approved projects cancelled or withdrawn by State highway departments. The 1,057 projects involved 10,580.17 miles of road, a total estimated cost of $92,933.121 81, and a total of $36,576.857.48 Federal aid. On the same date a total of 535 project agreements had been executed, involving 4,624.83 miles of road, a total estimated cost of $39,059,327.44, and a total of $15,614.929.61 Federal aid.

Crushed Slag Wholesale at Plant Per Ton

City or shipping point	Roofing	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Buffalo, N. Y.	1.45			Other sizes, .85@1.45			
E. Canaan, Conn.	3.00	1.00	3.00	1.15	1.10	1.05	1.00
Ensley, Ala.	2.05	.90		.90@1.20	1.00	.90	.85
Philadelphia Dist.	2.00@2.50	.75	1.50	.85	.85	.85	.85
Pittsburgh Dist.	2.00@2.50	1.00	1.50	1.00	1.00	1.00	1.00
Sharpsville, Pa.	1.75	1.00	1.25	1.00	1.00	1.00	1.00
WESTERN:							
Chicago, Ill.	All sizes, $1.50, F. O. B. Chicago						
Detroit, Mich.	All sizes, 1.65, F. O. B. Detroit						
Toledo, O.	All sizes, 2.00, F. O. B. Toledo						
Youngstown, Dover, Hubbard, Leetonia, and other Ohio points	1.75	1.00	1.25	1.00	1.00	1.00	1.00

Missouri Now Investigating Cement Prices

JEFFERSON CITY, Mo.—A resolution directing an investigation into the present prices of cement was adopted last week by the Missouri House of Representatives. It was charged on the floor of the House "that there is an unlawful combination in the state, which is buying up all the cement plants in Missouri, and by closing some of them, is boosting the price of cement." Attorney General Frank W. McAllister has been asked to make the investigation.

The resolution was introduced by Representative Wilkinson of Jackson County, who declared that he had been informed that the Standard Oil Co. of Indiana has bought up all the larger cement plants in the state and has closed some of them, thereby curtailing the output and advancing the price. The cost of cement in Missouri at present is $2.70, whereas before the war it sold for $1.50 per bbl.

Sand and Gravel Prices in New York City

NEW YORK—After many weeks of effort the sand, grit and gravel companies reached an acceptable price level last week without Federal assistance and once more these important building commodities are quotable in official lists, says the Dow Service Daily Building Reports. Prices for delivered material at job Manhattan and Bronx are: $2.25@2.50 for sand and grit; $3.25@3.50 for gravel and $3.25@3.50 a cu. yd. for crushed stone.

General News From The Rock Products Markets

Put Highways Transport Committee on Peace Basis

WASHINGTON, D. C.—The highways transport committee of the Council of National Defense has been entirely reorganized to permit of its operation on a peace-time basis. The work of the committee has been broadened and now includes representatives of Government Departments which, during the war, were not included.

The reorganized committee will be headed by John S. Cravens, of the Council of National Defense, and will consist of the following members: James I. Blakslee, fourth assistant postmaster general; J. M. Goodell, consulting engineer, Office of Public Roads, James H. Collins, representing the Bureau of Markets; R. S. MacElwee, representing the Department of Commerce; Charles W. Reid, executive secretary, and Grosvenor B. Clarkson, director of the council, ex-officio. The committee will be assisted by the advisory board consisting of Willian Phelps Eno, of Washington; Professor Arthur H. Blanchoard, New York; C. A. Musselman, Philadelphia; Raymond Beck, Akron, Ohio, and John T. Stockton, Chicago.

One of the important subjects to be considered in the future is the development of the rural motor express, in which much interest was aroused during the war because of the difficulty of getting rail transportation. The development of this service will depend, primarily, upon good roads.

At the annual convention of the Chamber of Commerce of the United States in St. Louis last week, a resolution calling for a Federal Highway Commission was adopted.

Question How Governments Are to Get Advantage of Rate Reduction

THE ILLINOIS SAND AND GRAVEL Producers' Association has been endeavoring to ascertain from Washington as to just how the reduction of ten cents per ton of freight rate on sand and gravel for public road construction and maintenance will be applied. The order authorizing the reduction specifically states that such materials must be consigned to, and the freight paid by the government, or, when consigned in care of a contractor the carrier must have positive information that the benefit of reduced rate will accrue to the government.

So far it has been unable to get definite information as to just what method will be used by the carriers to determine that application of the lower rate is proper when cars are consigned to or in care of contractors, and Ben Stone, the association director suggests that until this matter is cleared up, all such shipments be consigned to the state, county, township, or municipal official in charge of the work on which the material is to be used.

ROCK PRODUCTS has been informed that E. Guy Sutton has suggested that an affidavit from the contractor engaged on such work that the government will be the beneficiary of the reduced rate, should be sufficient. The railroad authorities, however, have issued no ruling on this suggestion to date.

The following excerpt from a letter from Director Chambers, dated April 24, is quoted for information:

"This arangement can only be applied to the commodities named and for the purposes specified in the Director General's announcement.

"It will not, therefore, be permissible to extend the reduction to material for the construction of dams, nor to any of the commodities named when they are not used as an essential element of road construction."

Castalia Company Drops the Receiver

PITTSBURGH, Pa.—The Castalia Portland Cement Co. of Pittsburgh, Pa., with plants at Castalia, O., is no longer in the hands of a receiver. The officers and directors for the coming year are announced as follows: President, G. W. Hackett; vice-president and treasurer, J. Twing Brooks; secretary, E. M. Humes; J. D. Rhodes, Geo. P. Rhodes, W. S. Kirkpatrick, J. T. Wilson, H. H. Brown.

U. S. Cement Exports in 1918

WASHINGTON, D. C.—A good market for American cement appears to exist in the Philippine Islands, according to the annual report just issued by the bureau of insular affairs of the War Department, which shows the total imports of the island during 1918 to have been 188,215 bbls., valued at $498,428, as compared with 142,947 bbls., with a value of $298,257, during 1917.

Although increasing nowhere nearly as much as imports from Japan and China, imports of American cement during 1918 show a decided increase as compared with the preceding year, the total being 2,661 bbls., worth $7,877, in 1918, as compared with 36 bbls., valued at $139, in 1917.

Imports from China increased from 72,242 bbls., worth $158,340, to 98,767 bbls., valued at $266,383; and those from Japan from 19,792 bbls., with a value of $37, 59, to 61,712 bbls., valued at $176,417.

Imports from Hongkong fell from 25,860 bbls., worth $60,525, to 3,037 bbls., valued at $10,180, and those from all other countries from 25,017 bbls., worth $41,494, to 22,038 bbls., with a value of $37,571.

A Correction

SIR—We notice in your issue of April 26th, in an article regarding the movement of The Schaffer Engineering and Equipment Company from Tiffin, Ohio, to Pittsburgh, Pa., a statement to the effect that this engineering company had built the plant of the Woodville Lime Products Co. of Woodville, Ohio.

This is an error. The plant at Woodville which The Schaffer Engineering Co. built was that of the Ohio Hydrate & Supply Co.

The Ohio Hydrate & Supply Co.,
By E. G. Baker, President.
Woodville, Ohio, April 28.

Check on German Potash Is Matter for Congress

WASHINGTON, D. C.—Replying to a request that some steps be taken to restrict importation of German potash into this country, President Wilson in a cablegram, April 28, advised Senator Hitchcock, of Nebraska, that it was doubtful whether any restrictive measures could be made effective in this matter without further action by Congress. He pointed out that potash was one of the articles which the allies had seen fit to permit Germany to export in payment for food, and that France now was offering potash for export from Alsace-Lorraine.

In this connection, this dispatch from New York Tribune is of interest:

Importations of potash from Alsace, offered for May and June delivery, and which are expected to arrive in this country in increasing volume from July on, have led the American manufacturers of this product to take steps for the protection of the domestic industry. The recently formed organization of potash producers, it was learned last week, will shortly lay before Congress a plan to assure the continued existence of the American industry. This plan will in all probability provide for an import duty on potash.

Opinion in the trade is divided as to the probable action Congress will take.

Passed By The Screens

Personals

A. V. Price has succeeded John Nelisse as purchasing agent for the Kelley Island Lime and Transport Co., Cleveland, O. Mr. Price was formerly assistant purchasing agent for the Lake Erie railroad which he served for eleven years.

August Heman, president of the Heman Construction Co., of St. Louis, who has been mayor of University City, Mo., for four consecutive terms, was re-elected mayor. and granted an increase in salary from $1 a year to $600 a year, at a recent election. Mr. Heman is a rock products producer in Missouri.

F. E. Finch, in charge of the Ruggles-Coles Eng. Co. of New York and **Wm. J. Kuntz,** treasurer and general manager of the Steacy-Schmidt Mfg. Co., will sail for Europe on the Baltic on May 15. Mr. Finch will go in the interests of the Ruggles-Coles Eng. Co.'s dryer and Mr. Kuntz in the interest of the Keystone kiln, the Schaffer hydrator and poidometer.

OBITUARY

Harlow N. Higinbotham. former business associate of Marshall Field of Chicago, who has killed in New York city two weeks ago by being struck by an army ambulance. was one of the financial backers of the National Portland Cement Co., which erected what is No. 4 mill of the Alpha Portland Cement Co. at Martin's Creek, Pa.

Charles W. McCormick, 74, assistant secretary of the Cleveland Stone Co., and who, during his 50 years in Cleveland, was active in civic and club organizations, died April 27. at the home of his son, Douglas McCormick, in Columbus, O. Several years ago Mr. McCormick was president of the Cleveland Builders Exchange. As a member of the Chamber of Commerce he participated in many of its activities. He retired from business four years ago. Since then, because of ill health, he spent much time in Florida. He was born on Point Pelee island, Canada. A son, Nelson, recently returned from service in France. Besides his two sons, Mr. McCormick is survived by his widow.

Incorporations

Louisville Lime Co., Louisville, O.; $10,000; John H. Werner.

Columbus Sand and Gravel Co., Columbus, O., $20,000 to $50,000.

Luckey Lime and Stone Co., Luckey, O.; $500,000; Henry A. Herkel.

Tioga Washed Sand & Gravel Co., Tioga, Pa.; $9,000; Charles W. Sheldon.

The Maulstone Co. has been incorporated for $10,000 to manufacture artificial stone at Toledo, Ohio.

Carmichael Co., Chicago; capital, $2,500; incorporators, T. O. Thompson, G. A. Regan and Gus Daniels.

American Agriculture & Chemical Co., Hagerstown, Md., has acquired 129 acres and will erect fertilizer factory.

Momence Phosphate & Limestone Co., Momence, Ill.; capital, $3,500; incorporators, I. F. Hertz, Emory Cobb, H. E. Styles.

Crystal Rock Products Co., Sandusky, O., $25,000; William M. Reynolds, H. J. Weitz, H. E. Gresham, E. C. Heil, J. A. Melcher

Shidler Construction Material Co., Kankakee, Ill.; capital, $50,000; incorporators, F. L. Shidler, Bertha Shidler, and Louis Pahnke.

Illinois Improvement & Construction Co., Chicago; capital, $500,000; incorporators, E. G. Seip, E. H. Kuttner and Lewis E. McDermut.

Romona Stone Products Co., Indianapolis; capital, $80,000; stone quarry; directors, Volney T. Malott. Frank M. Field, Samuel R. Harden, Anna Birchard.

Pulverized Limestone Sales Co., Bellefontaine, O., $10,000; L. T. Emery, Oren Outland, A. G. Steinbarger, Ernest M. Hamilton, B. F. Peters and John M. Hamilton.

The American Marl & Fertilizer Co., Richmond, Va., has been organized and plans are being made to construct a plant at a cost of $60,000. C. D. Gilliam is manager.

Carolina Crushed Shell Co., 144 E. Bay St., Charleston, S. C., capital $15,000, incorporated by H. G. Leiding and W. R. Bonsal; crush shell for poultry and agricultural lime.

Roanoke Lime Co., Roanoke, Va.; capital, $20,000; officers, James D. Johnston, president; John Izard, secretary, both of Roanoke. Object —general mining, milling and quarry business.

The Brown-Hufstetter Material Co., Indianapolis; capital $10,000; to own and lease land containing sand and gravel deposits; directors, Harry C. Huffstetter, Albert M. Brown, Walter M. Higgins.

Fehr & O'Rourke Stone Co., Inc., to quarry and market stone and other minerals; capital stock, $25,000; incorporators, Horace Fehr, James O'Rourke and Allen E. Hildebrand, all of Reading, Pa., and Jesse Hildebrand, Shillington, Pa.

La Harpe-Duluth Co., Duluth, Minn. Purpose: Mining and working ores and minerals; working coal mines and stone quarries. Capital, $200,000. Incorporators, J. Fuller Stafford, Agnes Carmody. L. M. O'Neill, H. A. Carmichael, Arthur W. McMillan, all of Duluth.

Application has been made to Governor Sproul of Pennsylvania for a charter for the Fehr & O'Rourke Stone Co. The applicants are Horace Fehr, James O'Rourke, Allen E. Hildebrand and Jesse E. Hildebrand. To engage in the quarrying, preparing and marketing of stone.

Spencer Quarry Co., Spencer, S. D., has been reorganized and incorporated with a capital stock of $50,000. The directors are C. H. Atkinson, of Watertown, W. A. Barnhart, of Salem, and G. W. Blackwood, Wm. Hoese and C. H. Caldwell, of Spencer. The officers are Wm. Hoese, president; W A. Barnhart, vice-president; C. H. Caldwell, secretary-treasurer. It is the intention of the company to build a modern rock crushing plant.

Quarries

J. H. Jones of Fostoria, O., has purchased a tract of land 140x160 feet on Park avenue, adjoining the old Lloyd stone quarry at Fostoria, for quarrying purposes.

Dissolution of corporation April 1, 1919; Colfax Stone Co., Chippewa Falls, Wis. President, John Peterson, Madison, Wis. Stock was $10,000. Business: Cutting and quarrying stone. Quarries at Colfax, Wis.

A granite quarry on the Daniels farm, near Denly, N. Y., on the Black river, is to be worked this year, if the tests made prove satisfactory. Peter C. Foley of Olean, a former Boonville, (N. Y.) resident, is back of the enterprise, and he has engaged Henry Lashway to open a quarry, with a view of getting out material for monuments. Mr. Foley is a large wholesale dealer.

After a litigation of 10 years, the Meramec Quarry Co. of St. Louis has finally come out the victor in a suit filed against the company by August Hunicke of Jefferson County, Mo., for $2,000 damages on account of injuries sustained by his son Fred Hunicke in an accident in the quarry. Hunicke's foot was crushed by a fall of rock. The plaintiff alleged that the company failed to provide proper medical treatment.

Missouri and North Arkansas railroad is making preparations for the reopening of its rock quarry at Libby, five miles east of Heber Springs, Ark. All old machinery is being replaced by new. The old crusher, which had a capacity of 200 yards per day, is being replaced by a 500-yard-per-day machine. A new pulverizer also is being installed. The plant has been idle for some months, on account of the scarcity of labor. W. W. Moody, formerly of St. Joe, is to be manager of the quarry.

Lime

Dallas' County, Texas, has one firm actively burning lime. The plant is located in Oak Cliff. near the western end of the Dallas-Oak Cliff viaduct. Austin chalk, near the base of that formation, is used as raw material, and the burnt product is known as "brown lime." Continuous kiln process is used. The capacity of the plant is 300 barrels per day. White lime is also burned, but the lime rock is brought from Southern Texas.

Sand and Gravel

Federal Sand & Gravel Company, Chicago; capital stock increased from $100,000 to $125,000.

The Rich Gravel and Excavating Co., of Knightstown, Ind.. filed preliminary certificate of dissolution.

Duff and Ruhlman of Warren, Pa., who will install a dredge in the Conewango for the purpose of taking out sand and gravel, have their outfit ordered. The dredge will be operated by electricity. Work of getting the plant in shape will be started at once and sheds will be erected so that all seasons of the year sand and gravel can be supplied.

Thomas H. Bell. receiver of the Trenton Sand and Gravel Co., Trenton, O., has been authorized by the court to pay all claims against the corporation that have been proved and allowed. The receiver has on hand $16,000 besides promissory notes, accounts receivable and claims due the corporation. Claims allowed by the receiver total $9,751.18 and judgments of $743.70 and $958.72.

Cement

Ironton Portland Cement Co., Ironton, O., has increased its capital from $400,000 to $650,000.

The Acme Cement and Plaster Co., St. Louis, and the Missouri Portland Cement Co., were among the first subscribers to the Fifth (Victory) Liberty Loan, subscribing to $150,000 worth and $63,000 worth of bonds respectively during the first few days of the campaign.

It is stated that the United States Steel Co. will manufacture cement in a big way as a by-product at their new big plant at Ojibway, Ont., which is now under construction and which will be completed within the next year or two. The manufacture of cement by the steel interests is not a new departure as it is being done by them in the states.

"Stuck in the mud only a few feet from the loading platform!" is the exclamatory opening sentence of the Portland Cement Association's latest pamphlet, "Concrete Industrial Driveways." Then the argument continues forcefully: "motor tearing away, wasting gasoline and oil, increasing useless wear and tear on machinery and tires!" And the time lost! Here is a piece of propaganda that ought to encourage the construction of driveways around manufacturing plants. The arguments are in the pamphlet, text and pictures, enough and conclusive enough it would seem to get the business. The horrible example is in it, the "before and after" picture and plenty of good examples found in many plants.

Retail Dealers

Inman Concrete Building Block & Machine Co., Beloit, Wis., has dissolvel. O. D. Inman, president. Stock was $5,000.

Livingston Lumber Co., Livingston, Wis. Retail lumber and building materials of all kinds. Increase of stock from $15,000 to $30,000.

Barker Lumber & Fuel Co., Watertown, Wis. Dealers in all kinds of building materials. etc. Increase of stock from $300,000 to $400,000.

Odgers, Block, Woelffer Co., Watertown, Wis. Increase of stock from $12,000 to $24,000. Dealers in monuments, granite, stone work, etc.

Marinette Fuel & Dock Co., Marinette, Wis. Increase of stock from $25,000 to $50,000. Dealers in wholesale fuel and building materials.

P. H. Quinn Lumber Co., Janesville, Wis. Stock, $30,000. P. H. Quinn, T. E. Mackin, Lewis F. Page. Lumber and all building materials.

The annual meeting of the Building Material Dealers' Association of Eastern Pennsylvania was scheduled for May 8 at the Hotel Adelphia, Philadelphia.

The South Byron Shipping & Trading Co., South Byron, Wis. $6,000. Art. A. Schellpfeffer, Oscar E. Maass, Oscar Bloohm. Lime, cement, building materials.

F. M. Funk, Dayton, O., has purchased the marble and granite works of the late Mr. Martin Haertel, Dodgeville, Wis. Has already taken possession.

Dells Lake Ice Co., Eau Claire, Wis. Cement, lumber, wood, lime, brick and all building materials. $10,000. Guy Spiers, Oscar E. Anderson, O. A. Elliott.

Maiden Rock Elevator Co., Maiden Rock, Wis. Capital, $25,000. A. L. Fisher, C. E. Swenberg, T. V. Hubison. Dealers in lime, building materials of all kinds, etc.

Eastman-Cartwright Lumber Co., Lancaster, Wis. Dealers in lumber and building material, cement, etc. Capital, $35,000. L. D. Eastman, W. C. Cartwright, O. M. Eastman.

Collieries Sales Co., Milwaukee, Wis. Stock, $75,000. Thos. C. Hughes, Richard A. Paine, Arthur L. Church, incorporators. Dealers in fuel and all kinds of building materials.

Zachow Lumber and Elevator Co., Zachow, Wis. (Shawano County), capital $25,000 stock. Retail lumber and building materials. E. A. Neufeld, Wm. Dix, Jr., Alvin Maas.

Wightman Concrete Machinery Co., Inc. Capital, $10,000. To manufacture concrete, etc. Incorporators: F. R. Iansell, Philadelphia; E. M. MacFarland, J. Vernon Pimm, Camden, N. J.

Bartel Sand & Gravel Co., Milwaukee, Wis. Stock, $5,000. Theo. J. Bartel, Alb. Bartel, Rozalia Pozorski, incorporators. Dealers in crushed stone, cement, sand, gravel, cement, brick, etc.

W. T. Griffin Co., Lowell, Mass., deal in coal, wood and cement, etc. Capital, $6,000. Directors: Wm. H. Harvey, president; Warren T. Giffin, Lowell, treasurer, and F. L. Phillips.

Capital Construction Co., Des Moines, Iowa. Capital, $50,000. General contracting. J. T. Harper, president; C. W. Wagner, vice-president; R. W. Harper, secretary-treasurer, Des Moines, Iowa.

"Partners" edited so successfully by R. H. Hildebrand for the Indiana Builders Supply Association has now become also the official bulletin of the Michigan Association of Builders' Supply Dealers.

H. H. Plummer Co., Menasha, Wis. Capital, $25,000. Harrison H. Plummer, Olive M. Plummer, Zilphia B. Plummer, incorporators. Construction work; dealers in lime, cement, sewer pipe, stone, sand, etc.

Federal Sand & Gravel Co., Chicago, Ill., register in Wisconsin; Grant U. Fisher, Janesville, Wis. Wisconsin stock, $25,000. Dealers in stone, lime, sand, gravel, cement, brick, etc. Capital stock, $100,000.

Danby Marble and Lime Co., Inc., Danby, Vt., wholesale and retail. Incorporators: Ellis H. Millard, Clark M. Potter, William P. Millard, of Danby, Vt., and E. O. Winship, New London, Conn. Capital, $6,000.

H. M. Stillman & Co., Milwaukee, Wis. Capital, $5,000. Henry M. Stillman, John W. Herrmann, James T. Drought, (Atty. Railway Exchange Building, Milwaukee, Wis.) Contractors and dealers in cement, stucco, plaster.

Sand Products Corporation, Manhattan, N. Y. Deal in sand, gravel and cement. Capital, $100,000. Incorporators: J. B. Morrow, 921 Gates avenue, Brooklyn; S. B. Klee, 772 St. Nicholas avenue; J. Galiani, 2400 Broadway, New York city.

Dissolution of corporation: Milwaukee Sidewalk Co., 309 Matthews Bldg., Milwaukee, Wis. Were engaged in construction of cement sidewalks, etc. President, Oscar K. Schlick; vice president, Otto C. Schlick; secretary and treasurer, Hugo A. Schlick.

The Rische Co., Milwaukee, Wis., capital $1,000. Contractors and builders and building materials including cement, stone, brick and articles manufactured therefrom. John F. Rische, Martha Rische, Chas. A. Klann. Attorneys: Fish, Marshutz & Hoffman, Wells Bldg., Milwaukee.

Wilbur S. Burns and his son, W. Maurice Burns, will engage in the building supply and fuel business at Wyoming Park, Mich., near Grand Rapids, under the style of the Burns Fuel Co. The company will be distributing agent for the Valley City Sand and Gravel Co. The son is expected home soon from service in France.

The Christa Marble Co. and the Batchelder Marble Co. of Detroit, Mich., have consolidated under the name of the Christa-Batchelder Marble Co. Both plants are still in operation and offices are at 492 Lafayette Boulevard and 1625 St. Aubin avenue. At a future date the combined plants will be located at the plant of the Batchelder Marble Co., which will be enlarged to receive the Christa machinery. Edgar Leavenworth and Chas. Batchelder are the moving spirits of the new concern.

Wheeling Wall Plaster Co. of Wheeling, W. Va., has issued No. 1 of its new publication, "Building Topics," for circulation among dealers, producers, architects, contractors and consumers of building materials. The editor promises that "the monthly will contain discussions on building conditions and important subjects of interest to all concerned with a view to cooperation in better building and closer understanding between the entire building family." The first issue is only four pages, but the hope is expressed to increase the number. The April number discusses editorially "The New Normal Standard" having to do with present prices and conditions. The company is producer of "Wheeling" wall plaster and jobber in building materials.

Manufacturers

The Jeffrey Manufacturing Co., Columbus, O., has recently published catalog No. 210 on the Jeffrey Improved Carrier, the company's latest type of pivoted bucket conveyor and made especially for the handling of coal, ashes, clinker, etc. It is a well bound book of 96 pages filled with pictures and blue print reproduction of layouts. It is ready for distribution to those interested.

The American Malleable Castings Association, Cleveland, Ohio, has issued for gratuitous distribution an authentic treatise on "Malleable Iron." There is but one book on the market today treating on malleable iron and it is so many, many years out of date that it is of little value. The latest booklet—although but a forerunner for a very comprehensive volume to be issued later by the association is filled with most valuable data. The subjects include Malleable Iron; The American Malleable Castings Association; The Uses of the Malleable Iron Casting; Annealing of Heavy Sections of Malleable Iron; Malleable Iron Castings Resist Rust. A copy of this book will be sent to any reader of Rock Products by the association on request.

Sauerman Bros., Chicago, have issued a 20-page illustrated pamphlet entitled "Highways and Railways for the Defense of Our Nation," an extract from a paper by Captain H. B. Sauerman of the Corps of Engineers, Illinois National Guard, 1912-1915, member of the American Society of Civil Engineers and of the Western Society of Engineers. It is an especial boost for good roads. The paper proposes a general plan of defense and advocates a system of good roads and government owned and operated coastal railroads, and a trenching system. The coastal railroads are to connect certain defined mobilization points, training camps, etc. "Improved highways, 20 ft. wide are to be built at right angles to the coastal railroad, from 1½ to 3 miles apart. Other improved roads are to be built parallel to the railroad, five to eight miles apart. This plan will enable us to concentrate our mobile forces in the shortest possible time at the point of invasion and to the best advantage. In times of peace the government owned railroads and the improved highways will promote our commercial growth." Plates and photographs show his plan in detail. Sauerman Bros. will send the book free to all who may be interested.

CLASSIFIED ADVERTISING

ADVERTISEMENTS in this department are for Positions Wanted, Positions Vacant, Business Opportunities, Plants for Sale, etc.

RATES: 25c per line, per insertion; minimum charge, 50c. With display of any sort, $2.50 per column inch, per insertion, check with order.

Plants for Sale

GLASS SAND PROPERTY
FOR SALE

25 acres No. 1 HIGH GRADE GLASS SAND at Berkeley Springs, W. Va., B. & O. R. R. Also, large tract GLASS SAND property, near Great Cacapon, W. Va., B. & O. R. R. Address

N. Q. SPEER
Berkeley Springs **West Virginia**

STONE QUARRY

For rent, at sight, 920,000 cubic meters of stone, switch connection with Havana Central R. R.; at San Francisco de Paula. For further information address

M. A. GLYNN
San Francisco de Paula **Habana**

FOR SALE—Half or whole interest in 18 acres best Agric. Lime Quarry; 20 ft. breast. Switch connections to L. N. R. R. Fully equipped for business. Demand for all product at good price, at quarry. Come and see. Frank Dittbenner, R. F. D. No. 3, Franklin, Ky.

Situations Wanted

SUPERINTENDENT desires engagement with reputable company where ability and thorough knowledge of quarrying is recognized in the performance of efficient operation. References. Address Box 1310, care ROCK PRODUCTS.

POSITION WANTED

Salesman, nearly fifteen years' experience with one of the leading distributers and manufacturers of lime in the east and splendid connections with the metropolitan trade, as well as that of Long Island and New Jersey, seeks connection with manufacturer of first class Ohio finishing hydrated lime. Correspondence with manufacturers of bbl. lime and common hydrated lime solicited also. Can furnish best of references.

C. G. BELING, 267 W. 126th St., New York City, N. Y.

Help Wanted

WANTED—Chemist for a cement plant. One who has a fair knowledge of engineering and construction work. Apply Box 865, Charleston, S. C.

WANTED—Live superintendent for steam shovel crusher plant; salary and bonus. Address Box 1309, care ROCK PRODUCTS.

Associates Wanted

BUSINESS ASSOCIATE WANTED—Old established limestone produce corporation offers substantial interest to active associate, capable financing necessary expansion; party possessing engineering knowledge preferred. Particulars, Roberts-Frost Company, 505 Fifth Avenue, New York.

USED EQUIPMENT

ADVERTISEMENTS in this department are for the Sale and Want of Second-Hand Machinery and Equipment.

RATES: $2.50 each column inch per insertion, check with order.

FOR SALE

No. 12K Gates crusher, Manganese fitted, nickel steel shaft, **$5750.00.**

1—2500 ton crushing plant, Mang. fitted, with Corliss engine drive.

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